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**RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL**

AD-A214 220

**ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES,
ILLINOIS**

SEPTEMBER 1989

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RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

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ACKNOWLEDGEMENT

Primary study team personnel who are familiar with the technical aspects of the study are listed below:

STUDY MANAGEMENT: Teresa Kirkeeng-Kincaid

ENVIRONMENTAL STUDIES: Joseph Slater

ECONOMIC ANALYSIS: Patricia Risser

HYDRAULIC ANALYSIS: Richard Engstrom

COST ESTIMATE: Jerry Crittenden and
Mike Shamsie

SYLLABUS

The Illinois and Michigan Canal is located in northern Illinois. The entire canal is 96 miles long and is owned and managed by the Illinois Department of Conservation. Flooding occurs along portions of the canal. In 1983, the Department of Conservation requested an investigation of the problem by the Corps of Engineers under Section 205 of the 1948 Flood Control Act, as amended.

The Corps completed an initial appraisal in 1985 that narrowed the area to be examined to a 10.5-mile reach within La Salle and Grundy Counties.

This reconnaissance study examined the study area in two reaches. The first reach extends from the Waupecan Island spillway west to the mouth of Carson Creek. In this area, approximately 400 acres of agricultural land is flooded when the canal is overtopped. One of the flood control alternatives which was evaluated involved clearing the channel of debris and material which has silted in. The costs of removing 30,000 yd³ and 60,000 yd³ were estimated, but both levels had benefit-to-cost ratios less than 1.0.

The flooding problem in the second reach of the canal is centered in the village of Seneca. The problem is caused by the insufficient capacity of Crotty Creek which is located on the eastern side of Seneca. The Crotty Creek basin does not meet Corps of Engineers criteria for minimum drainage area or minimum flow. However, widening the channel to increase capacity to a 100-year discharge was evaluated, with a benefit-to-cost ratio of 0.43. Lands, easements, and rights-of-way costs are not included in the cost estimate.

Since no flood damage reduction alternatives warrant additional study, the study will be terminated.

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ILLINOIS AND MICHIGAN CANAL
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RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

SECTION 1 - INTRODUCTION

This report presents the results of an investigation of the flooding problems along the Illinois and Michigan Canal within La Salle and Grundy Counties, Illinois. The canal is owned and managed by the Illinois Department of Conservation (IDOC). In a letter dated August 19, 1983, the IDOC requested that the Section 205 study authority be enacted to examine the flooding problem. An initial appraisal was completed in 1988 and a reconnaissance study was initiated in February 1988.

STUDY AUTHORITY

The Corps of Engineers is authorized to construct certain projects without the specific authorization of Congress. The authority for this report is Section 205 of the 1948 Flood Control Act, as amended.

STUDY PURPOSE AND SCOPE

The purpose of the reconnaissance study is to define the flooding problem, identify potential solutions, and determine whether there is a Federal interest in a flood damage reduction plan, based on a preliminary appraisal of costs, benefits, and environmental impacts. The reconnaissance study phase is also the appropriate time to assess the level of interest and support in the potential solution by non-Federal interests.

STUDY AREA

The Illinois and Michigan Canal is located in north-central Illinois within La Salle, Grundy, and Will Counties near the communities of Morris, Seneca, and La Salle. The study area is a 10.5-mile reach in La Salle and Grundy Counties (see plate 1). These parameters were based on an earlier Corps study which narrowed the area to where there was a potential Federal interest.

STUDY DURATION

This study was conducted over a 15-month period beginning in February 1988.

TYPE, DEPTH, AND DETAIL OF INVESTIGATION

The following areas were emphasized in this reconnaissance phase study: hydrology and hydraulics, design and cost estimates, and economics (benefit analysis). A brief environmental review also was made. The study was conducted in sufficient detail to determine if there is a Federal interest in a flood reduction plan for the study area. Federal interest is determined by economic feasibility, environmental impacts, acceptability, and willingness of the local sponsor to cost-share further studies and/or construction.

RELATED STUDIES, REPORTS, AND EXISTING WATER PROJECTS

Comprehensive Development and Management Plan, Illinois and Michigan Canal, Phase One, prepared for the State of Illinois, Department of Transportation, by Harland Bartholomew and Associates, December 1972. This report describes a comprehensive development and management plan for the canal with a major focus on historic preservation and recreational use.

Comprehensive Development and Management Plan, Illinois and Michigan Canal, Phase Two, prepared for the State of Illinois, Department of Transportation, by Harland Bartholomew and Associates, January 1974. This report describes the development plan for the canal right-of-way and a management plan for the canal.

Investigation of Flood Problems, Phase I, Illinois and Michigan Canal, between Carson Creek and Waupecan Island Spillway, prepared by the Illinois Department of Transportation, Division of Water Resources, August 1981. This report describes the repeated flooding of agricultural land south of a 4.9-mile reach of the canal and presents numerous plans to reduce the flooding.

Investigation of Flood Problems, Phase II, Illinois and Michigan Canal, Between North Kickapoo and Carson Creeks, prepared by the Illinois Department of Transportation, Division of Water Resources, September 1981. This report describes the flooding of residential and agricultural property in and around the village of Seneca. Several solutions to the flooding are presented.

Section 205 Initial Appraisal, I and M Canal, La Salle to Will/Grundy County Border, Illinois, prepared by the U.S. Army Corps of Engineers, Rock Island District, August 1985. The report summarizes the Corps of Engineers study effort of flooding problems along the canal. The report recommended additional study of a 10.5-mile segment of the canal.

SECTION 2 - PLAN FORMULATION

ASSESSMENT OF WATER AND LAND RESOURCE PROBLEMS AND OPPORTUNITIES

EXISTING CONDITIONS

General

The existing condition of the waterway is an important element in the formulation of alternatives and the measurement of flood damages occurring within and adjacent to the canal.

The canal is a man-made system which was constructed for water-borne commerce and was operated from the mid-1800's to the early 1900's. The IDOC has had jurisdiction over the canal and responsibility for its management since January 1974. The canal still retains almost all of its original rights-of-way.

The entire canal is 96 miles long and consists of 14 locks and dams. The original locks and dams maintained a normal pool of 6 feet. However, natural weathering processes and disrepair have diminished the system's ability to maintain a navigable waterway. Restoration of a lock and dam near La Salle and rehabilitative construction elsewhere are being undertaken to emphasize the original designs, functions, and characteristics of the waterway. These efforts have restored a constant pool level which benefits recreational use, to include: sport fishing, hiking, bicycling, canoeing, and snowmobiling. The canal also provides limited flood control.

The Illinois and Michigan Canal was constructed across many Illinois River tributaries and was designed to accept drainage from a portion of these. The remainder of the tributaries cross the canal through a series of culverts under the canal. The canal also discharges into the Illinois River via gates, weirs, and spillways. This discharge fluctuates during various hydraulic conditions, and the canal does not have adequate capacity for the less frequent floods. The canal tow path has been overtopped several times, inundating adjacent farmland and residential property in the village of Seneca.

The portion of the canal within the study area corresponds to Illinois River miles 250.0 to 260.5 (plate 1). For study purposes, this was divided into two sections (plates 2 and 3). The first section is from R.M. 260.5 to 255.5 and is bordered on the east by the Waupecan Island spillway and on the west by an earthen dam across the canal. This section is characterized by heavy tree growth approximately 10 feet wide along both the tow and berm paths which has contributed to erosion of the embankments around the trees. Also, there are many areas where trees have fallen into the channel. Carson Creek, which feeds into the canal and is close to the western border of this section, carries sediment into the canal. Consequently, this section is silted in, which has reduced its carrying capacity.

The second section of the canal within the study area is from R.M. 255.5 to 250.0. The village of Seneca is located at R.M. 253.0. Between Seneca and R.M. 255.5, the canal is characterized by dense tree growth within the channel. No water flows in this portion of the canal. The portion of the canal between Seneca and North Kickapoo Creek (the western border of the study area) is silted in and trees are well established along the tow and berm paths. The IDOC performed a channel modification in recent years from Seneca to the North Kickapoo Creek crossing. The modification has a 10-foot bottom width, 2:1 side slopes, and is approximately 5 feet deep.

Hydrology and Hydraulics

The Illinois and Michigan Canal crosses numerous drainage areas which complicates the hydrology of the canal. The IDOC has made several modifications to the canal which affect flow.

The original canal was designed to flow in a westerly direction. An earthen dam installed west of Carson Creek and a 6-foot by 10-foot discharge gate installed next to the Waupecan Island Spillway have changed the flow to an easterly direction. Carson Creek discharge enters the canal and flows the length of the

first section to the discharge gate where it exits to the Illinois River. Adding the gate at a lower elevation than the spillway crest has allowed some cleanout of the sediment deposited in this section of the canal.

Water flows westerly in the section of the canal from Seneca to the North Kickapoo Creek crossing. Flooding in the study area has occurred along several areas of the canal. When the tow or berm paths are overtopped and damaged, the IDOC has reconstructed the embankments. The area with the greatest damage in the first section is 200 to 400 acres of agricultural land at R.M. 256.7.

The area most heavily damaged in the second section is residential property in the village of Seneca. Approximately 8 to 10 properties have been damaged by flooding from Crotty Creek which enters the canal just east of Seneca. Crotty Creek has a drainage area less than one square mile. The discharge of the 10-year flood is 240 cubic feet per second which is less than the 800 minimum that is required for the Corps of Engineers to participate in a project.

Hydraulic profiles for the section of the canal from Waupecan Island Spillway to Carson Creek and Crotty Creek are contained in Appendix A - Hydrology and Hydraulics. In section 1, overtopping of the tow path where agricultural flooding occurs begins at the 10-year level. In section 2 near Seneca, flooding also begins at the 10-year level.

Environmental Setting and Natural Resources

The Illinois and Michigan Canal represents a wildlife habitat corridor that bisects intensively farmed agricultural lands along its route. Since the canal is no longer used for navigation purposes subsequent lack of maintenance has allowed an even-aged stand of growth to invade the canal prism as well as the canal towpath and berms. Trees growing within the canal limits include typical bottomland species like sycamore, hackberry, cottonwood, silver maple, boxelder and green ash. Understory vegetation includes poison ivy, nettles, jewelweed, greenbrier, Solomon's seal, and many other woody and herbaceous plants.

The remnant of canal included in this project has little or no fisheries value since the majority of the canal only has water in it following a rainfall. Therefore, the primary wildlife value lies in the terrestrial mammalian and avian populations. A large emergent wetland complex, owned and managed by a local duck hunting club, lies adjacent to approximately 2 miles of canal berm (Illinois River mile 257). In addition to the waterfowl

benefits generated by the wetland, many nongame species including herons, cormorants, and numerous songbird species find food and refuge within the confines of the wetland.

White-tailed deer, raccoon, beaver, muskrat, woodchuck, squirrel, and cottontail rabbit are common mammals that use the canal corridor to access agricultural fields or the Illinois River bottomland forest nearby.

The Illinois and Michigan canal serves a vital function for those wildlife species whose life requirements require larger unbroken tracts of habitat in order to survive and reproduce in the area. Smaller fragmented tracts of habitat interspersed within the mosaic of farmland are linked together by a travel corridor of habitat.

Climatology

La Salle and Grundy Counties have a continental climate which features warm-to-hot summers and moderately cold winters. In the winter, the average temperature is 26 degrees Fahrenheit (F) and the average daily minimum temperature is 17 degrees F. The lowest temperature on record, which occurred at Gebhard Woods Park on December 23, 1960, was -22 degrees F. The average summer temperature is 72 degrees F and the average daily maximum temperature is 84 degrees F. The highest recorded temperature, which occurred at Gebhard Woods Park on July 10, 1966, is 102 degrees F. Annual precipitation is 30 inches, of which 21 inches, or 70 percent, usually falls in April through September. The prevailing wind is from the west, with speeds averaging 11 miles per hour.

Threatened and Endangered Species

Coordination with the U.S. Fish and Wildlife Service and the IDOC was initiated to determine if the proposed project would impact on Federal or State listed endangered or threatened species (see appendix D). The U.S. Fish and Wildlife Service lists two federally endangered species which may inhabit the project area. The bald eagle (Haliaeetus leucocephalus) is known to winter along the Illinois River, feeding in the open water areas and roosting in the mature trees which provide shelter from the harsh winter conditions. The Fish and Wildlife Service indicated that bald eagles have not been observed within the immediate project area.

The other federally listed species is the Indiana bat (Myotis sodalis). Although the canopy cover habitat is probably suitable for the bats, the only time that they would use the area would be if there was water in the canal.

Cultural Resources

The Illinois and Michigan Canal is listed on the National Register of Historic Places. On August 24, 1984, the canal and its environs were designated a National Heritage Corridor to commemorate the role played by the canal in the westward expansion of the United States. In addition to the significant canal and associated features, the corridor is known to contain prehistoric and historic archeological resources.

FUTURE CONDITIONS WITHOUT PROJECT

The agricultural land along the canal will continue to flood, as will residential property in Seneca. It is difficult to predict the level and/or frequency of flooding. The IDOC continues to make improvements to the canal, but future amounts are dependent on budget levels. The greater the IDOC's ability to fund cleanout projects, tow and berm path repairs, and continued maintenance, the less severe the floods will be.

PROBLEMS, NEEDS, AND OPPORTUNITIES

The water resource problem considered in this study is flooding within the study area by overtopping of the Illinois and Michigan Canal. The IDOC's request for Corps of Engineers' assistance is contained in Appendix D - Correspondence. In response to this request, an Initial Appraisal was conducted in 1984 and 1985. The study concluded that there was potentially a feasible solution to the flooding problem and recommended that the study proceed to the next phase (reconnaissance study). Funding for this reconnaissance study was received in January 1988.

PLANNING OBJECTIVES

NATIONAL OBJECTIVE

The national objective of water and related land resources planning is to contribute to economic development consistent with protecting the Nation's environment. Contributions to National Economic Development (NED) are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct benefits and costs that accrue in the planning area and the rest of the Nation, and include increases in the net value of those goods and services that are marketed.

SPECIFIC OBJECTIVE

The specific planning objective for this study is to reduce economic losses associated with flooding along the Illinois and Michigan Canal, between Illinois River miles 250.0 and 260.5.

PLANNING CONSTRAINTS

The Section 205 authority provides for the construction of projects for flood control and related purposes. Each project is limited to a Federal investment of not more than \$5 million, including all project-related costs for investigation, inspection, engineering, preparation of plans and specifications, supervision and administration, and construction. Water resources planning studies are bound by all State and Federal laws and Executive Orders.

ALTERNATIVE PLANS

AVAILABLE MEASURES

The available measures used to alleviate flooding include both nonstructural and structural means. Nonstructural measures are defined as those which reduce or avoid flood damages, without significantly altering the nature or extent of flooding, by changing the use of floodplains, or accommodating existing uses to the flood hazard. Examples of nonstructural measures are

floodproofing, permanent evacuation, and regulation of flood-plain uses. No nonstructural alternatives were evaluated along the canal because damage is to agricultural lands. Flooding in Seneca occurs too rapidly to implement temporary evacuation or floodproofing.

Structural measures include dams and reservoirs, levees, dikes, walls, diversion channels, bridge modifications, and channel alterations. All such measures reduce the frequency of damaging overflows.

DEVELOPMENT OF ALTERNATIVE PLANS

FORMULATION CRITERIA

Formulated plans must contribute to the Federal objective of NED. One of these plans must reasonably maximize contributions to NED, and the remaining plans may be formulated in order to further address certain Federal, State, and local concerns not fully addressed by the NED plan. All plans should be formulated in consideration of completeness, effectiveness, efficiency, and acceptability.

DESCRIPTION OF PLANS

Plans are evaluated for the two sections of the canal being examined in this study. Structural alternatives are evaluated for both sections of the canal.

Section 1

Plan A - Channel Modification

This plan includes the removal of sediment from within the canal. Sediment would be removed from the entire 4.9-mile section of the canal (plate 2). Two levels of removal are evaluated: 30,000 and 60,000 cubic yards. The exact amount of sediment within the channel is unknown; past studies have indicated 90,000 and 60,000 cubic yards. The 30,000, and 60,000-cubic-yard amounts were chosen for reasons explained later in the narrative. However, the analysis and evaluation were performed assuming each removal would accomplish the same end result -- returning the canal to its original configuration.

The canal currently overtops at a 10-year frequency flood. The channel modification would reduce this such that overtopping does not occur until a 25-year flood. Therefore, damages would be eliminated between the 10-year and 25-year occurrences, but they would still occur when flooding exceeded a 25-year occurrence. The total number of acres of agricultural land damaged by flooding is approximately 400. Under existing conditions, about 300 acres are flooded by 10- to 25-year floods. It is difficult to determine exact acres damaged because the hydrology of the area is fairly complex, and detailed topography is not available. The number of acres damaged was estimated from aerial photographs taken during a flood and from U.S.G.S. quadrangle maps.

An analysis performed by the Illinois Department of Transportation, Division of Water Resources, in 1981 determined that there was approximately 90,000 cubic yards of excess material in the channel. Since the study, a box culvert was installed next to the Waupecan Island spillway. Some of the sediment in the canal has been removed by natural means through the box culvert. In 1984, a previous analysis performed by the Corps of Engineers estimated that 60,000 cubic yards of excess material remained within the channel.

No additional surveyed cross sections were taken for this study. The 30,000- and 60,000-cubic-yard amounts were chosen based on the past studies and also to perform a sensitivity analysis, i.e., to determine if a project would be feasible at either level of modification. The sediment removed from the channel would be deposited within various disposal sites adjacent to the canal and within the IDOC's right-of-way. These disposal areas are wooded and would require clearing.

There is a 10-foot-wide growth of trees along both the tow and berm paths. The presence of the trees impairs the structural integrity of the embankments and contributes to erosion of the embankments. Therefore, the trees would have to be removed and the embankment rebuilt. The slopes would be seeded. A bridge crossing the canal at approximately R.M. 258.8 would be removed and replaced because it restricts flow.

No costs are included in the estimates for lands, easements, and rights-of-way (LER). Although all lands are owned by the IDOC, they do have a value which must be assigned as a cost and is normally included in the benefit-to-cost analysis. In this case, it would not be of the magnitude of the construction work and therefore would not appreciably raise the total estimate.

The cost estimate for Plan A (30,000 and 60,000 cubic yards) is presented below in tables 1 and 2.

TABLE 1

Plan A - Channel Modification
Removal of 30,000 Cubic Yards

| <u>Item</u> | <u>Costs (\$)</u> |
|--|---------------------------------|
| Lands, Easements, Rights-of-Way, and Disposal Areas (9 sites of 0.5 acre each) | (Not estimated at this time) |
| Clear Disposal Areas | 14,400.00 |
| Clear Tow and Berm Paths | 60,690.00 |
| Channel Excavation (30,000 yd ³) | 120,000.00 |
| Rebuild Slopes | 240,000.00 |
| Seeding | 27,060.00 |
| Bridge Removal and Replacement | <u>60,000.00</u> |
| Subtotal | 522,150.00 |
| Contingencies (25 percent) | <u>130,550.00</u> |
| Subtotal | 652,700.00 |
| Engineering and Design (8 percent) | 52,200.00 |
| Supervision and Administration (6 percent) | <u>39,100.00</u> |
| TOTAL | 744,000.00 |

TABLE 2

Plan A - Channel Modification
Removal of 60,000 Cubic Yards

| <u>Item</u> | <u>Costs (\$)</u> |
|--|---------------------------------|
| Lands, Easements, Rights-of-Way, and Disposal Areas (9 sites of 0.9 acre each) | (Not estimated at this time) |
| Clear Disposal Areas | 25,920.00 |
| Clear Tow and Berm Paths | 60,690.00 |
| Channel Excavation (60,000 yd ³) | 240,000.00 |
| Rebuild Slopes | 240,000.00 |
| Seeding | 27,060.00 |
| Bridge Removal and Replacement | <u>60,000.00</u> |
| Subtotal | 653,670.00 |
| Contingencies (25 percent) | <u>163,333.00</u> |
| Subtotal | 817,000.00 |
| Engineering and Design (8 percent) | 65,000.00 |
| Supervision and Administration (6 percent) | <u>49,000.00</u> |
| TOTAL | 931,000.00 |

Economics

The first costs of this plan equal \$744,000 and \$931,000. The average annual cost of removing 30,000 cubic yards is \$73,000, annual benefits equal \$32,800, and the benefit-to-cost ratio is 0.45. For the 60,000-cubic-yard removal, average annual costs equal \$91,500 and annual benefits equal \$32,800. The benefit-to-cost ratio is 0.36. Detailed cost estimates are contained in appendix B. A description of the benefits and the economic analysis is contained in appendix C.

Environmental Resources

Implementation of the above alternative would have an impact on the local wildlife population. The loss of the habitat along the canal represents the most obvious impact to the area. However, secondary impacts such as disruption of the travel corridor along

the canal are also important considerations to evaluate. Following the clearing, the canal towpath and berm will be reconstructed and seeded with grasses to stabilize the site. Future maintenance would include regular mowing and removal of woody vegetation. The area probably would be favored by species which are more grassland dependent as opposed to the existing woodland fauna.

The Fish and Wildlife Service feels that this would be an even tradeoff of habitat in most cases. However, the surrounding area is intensively farmed and the canal does represent a well-used travel corridor in its present state. As a result of the loss of woodland habitat, the Fish and Wildlife Service recommends a mitigation plan of no net loss of in-kind habitat. Compensation in the form of tree plantings of native mast trees would be suggested as one option. Perhaps a nearby site owned by the IDOC (the project sponsor) would be suitable for planting an area twice the size of what is removed being planted to offset the time lag between planting and the time when the trees are producing a mast crop.

Threatened and Endangered Species

Modification of the canal would not affect the Indiana bat, and it is unlikely that the bald eagle would be affected either.

Cultural Resources

The Illinois and Michigan Canal is listed on the National Register of Historic Places. On August 24, 1984, the canal and its environs were designated a National Heritage Corridor to commemorate the role played by the canal in the westward expansion of the United States. In addition to the significant canal and associated features, the corridor is known to contain prehistoric and historic archeological resources.

Any modification of the existing channel must be in keeping with the Secretary of the Interior's Standards to preserve and maintain the overall appearance and setting of the canal.

Any undertaking must be coordinated with the Illinois State Historic Preservation Officer and the Advisory Council on Historic Preservation. Furthermore, any disposal site or proposed excavation area must be evaluated to determine if significant archeological deposits are present.

Section 2

Plan B - Channel Modification of Crotty Creek

This plan includes widening the Crotty Creek channel from its mouth (at the Illinois and Michigan Canal) upstream approximately 750 feet (plate 4). The bottom width of the channel would be enlarged from its current width of 10-15 feet to a width of 35 feet. The material would be disposed of within one-half mile of the project.

Currently, the channel's capacity is exceeded by floods greater than a 10-year. The channel modification would carry a 100-year discharge without overtopping.

Two crossings of the channel would be removed and replaced with box culverts. The channel slope would be seeded.

The first cost of this plan is \$118,200. No lands, easements, and rights-of-way costs are included in the estimate. See table 3 for a cost summary.

TABLE 3

Plan B - Channel Modification of Crotty Creek

| <u>Item</u> | <u>Costs (\$)</u> |
|--|---------------------------------|
| Lands, Easements, and Rights-of-Way | (Not estimated at this time) |
| Stripping | 1,614.35 |
| Channel Excavation | 18,543.15 |
| Remove Existing Bridge | 1,900.00 |
| Replace Crossing with Box Culverts | 27,900.00 |
| Remove Existing C.M.P.'s | 900.00 |
| Replace Crossing with Box Culverts | 28,500.00 |
| Seeding | <u>800.00</u> |
| Subtotal | 80,157.50 |
| Contingencies (25 percent) | <u>20,042.50</u> |
| Subtotal | 100,200.00 |
| Engineering and Design (10 percent) | 10,000.00 |
| Supervision and Administration (8 percent) | <u>8,000.00</u> |
| TOTAL | 118,200.00 |

Economic Effects of Plan B

Average annual costs are \$12,100 and annual benefits are \$5,400. The benefit-to-cost ratio is 0.45. Lower levels of protection have lower benefit-to-cost ratios since significant damage begins at the 100-year flood event. A more detailed cost estimate is contained in appendix B. A description of the benefits and the economic analysis is contained in appendix C.

EVALUATION OF ALTERNATIVE PLANS

Neither Plan A nor Plan B have benefits which exceed costs. A summary of costs and benefits is displayed in table 4.

TABLE 4

Flood Damage Reduction Measures Economic Summary

| <u>Plan</u> | <u>Total First Cost(\$)</u> | <u>Average Annual Costs(\$)</u> | <u>Annual Benefits(\$)</u> | <u>Net Benefits(\$)</u> | <u>BCR</u> |
|------------------------|-------------------------------------|---|--------------------------------|-----------------------------|------------|
| A | | | | | |
| 30,000 yd ³ | 744,000 | 73,000 | 32,800 | 0 | 0.45 |
| 60,000 yd ³ | 931,000 | 91,500 | 32,800 | 0 | 0.36 |
| B | 118,200 | 12,100 | 5,400 | 0 | 0.45 |

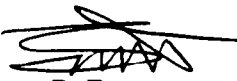
CONCLUSIONS

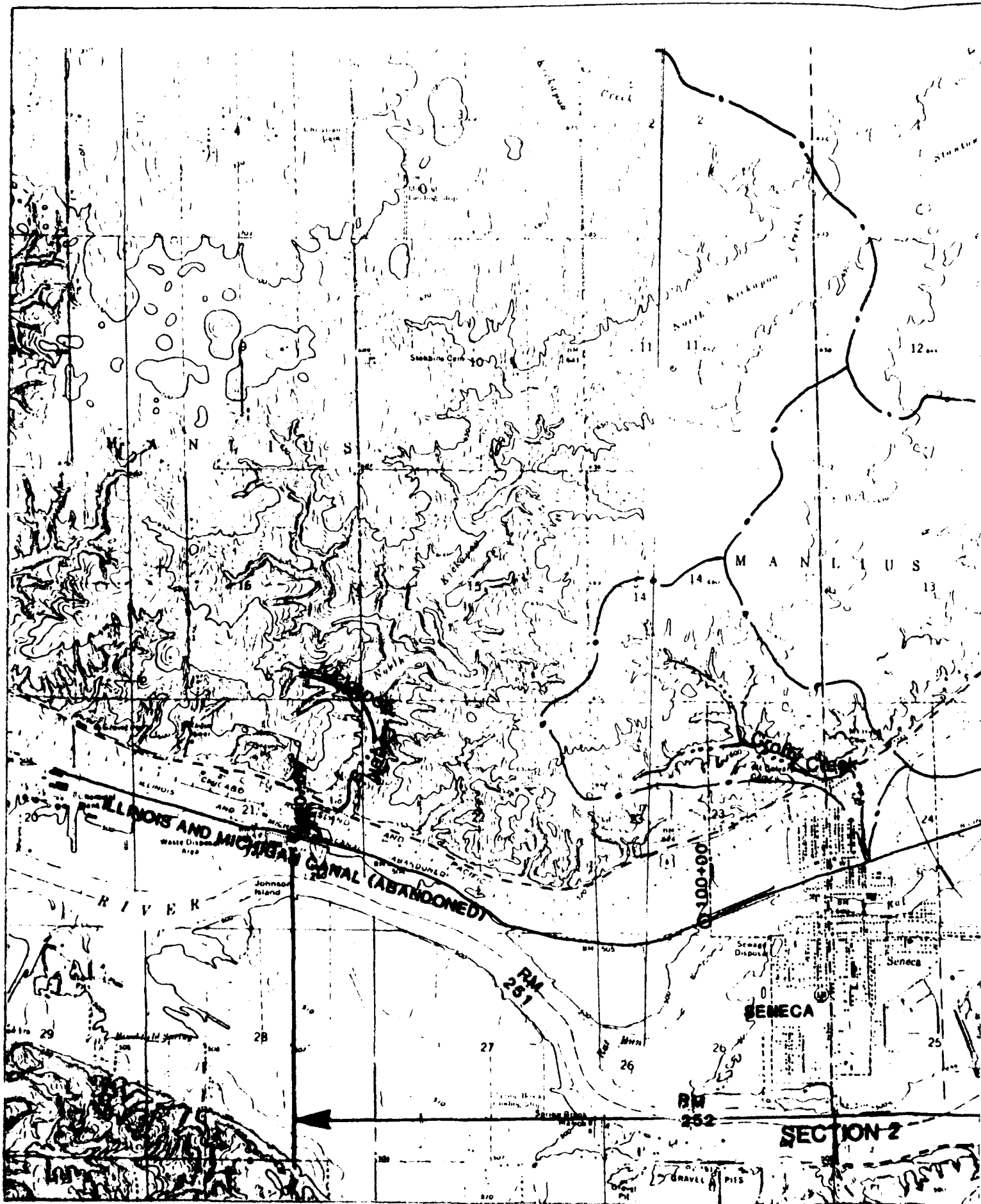
This study evaluated flood damage reduction measures along the Illinois and Michigan Canal between Illinois River Miles 250.0 and 260.5. The study area was determined by a 1984 Corps of Engineers study.

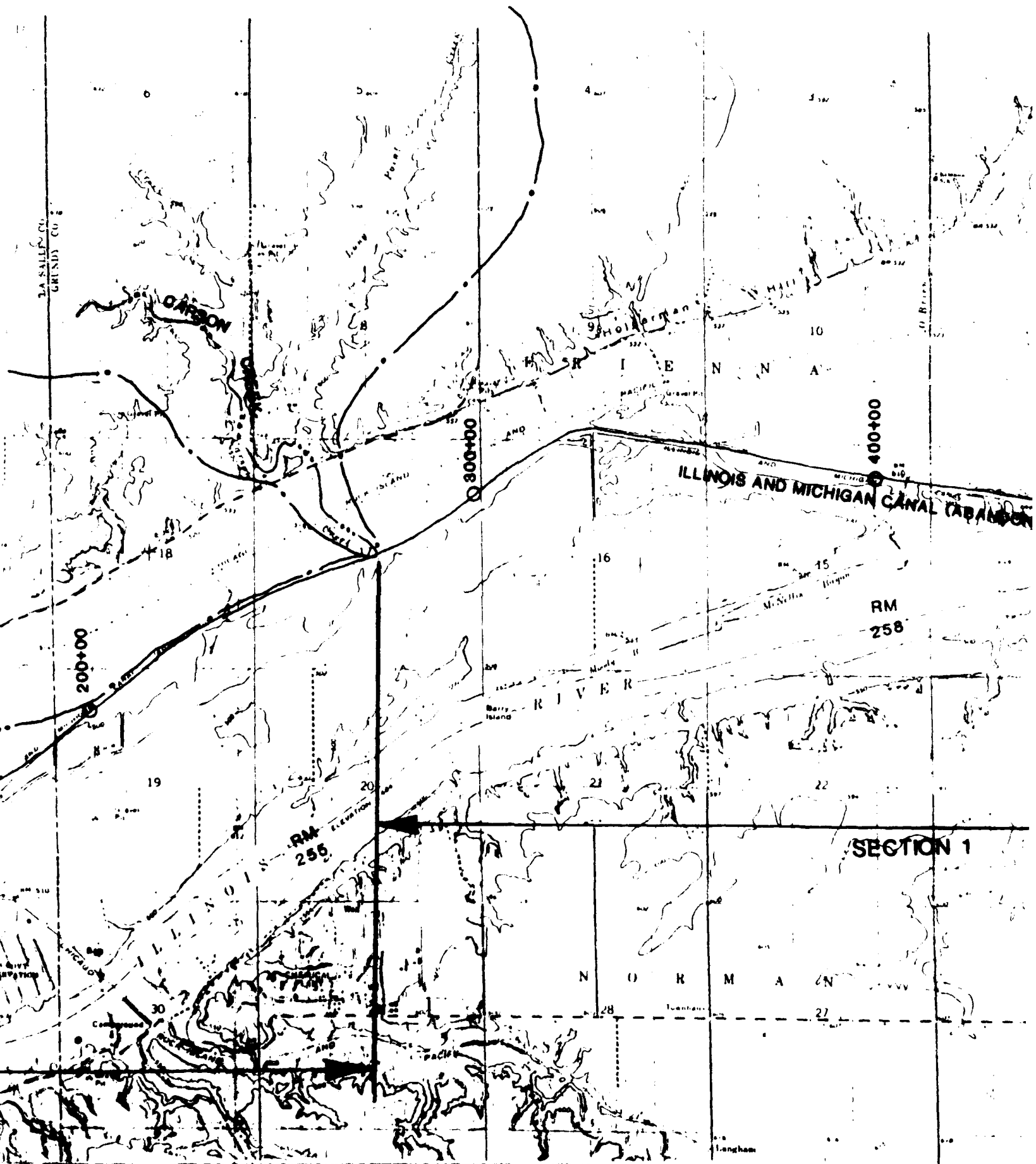
All plans evaluated are found to be economically infeasible.

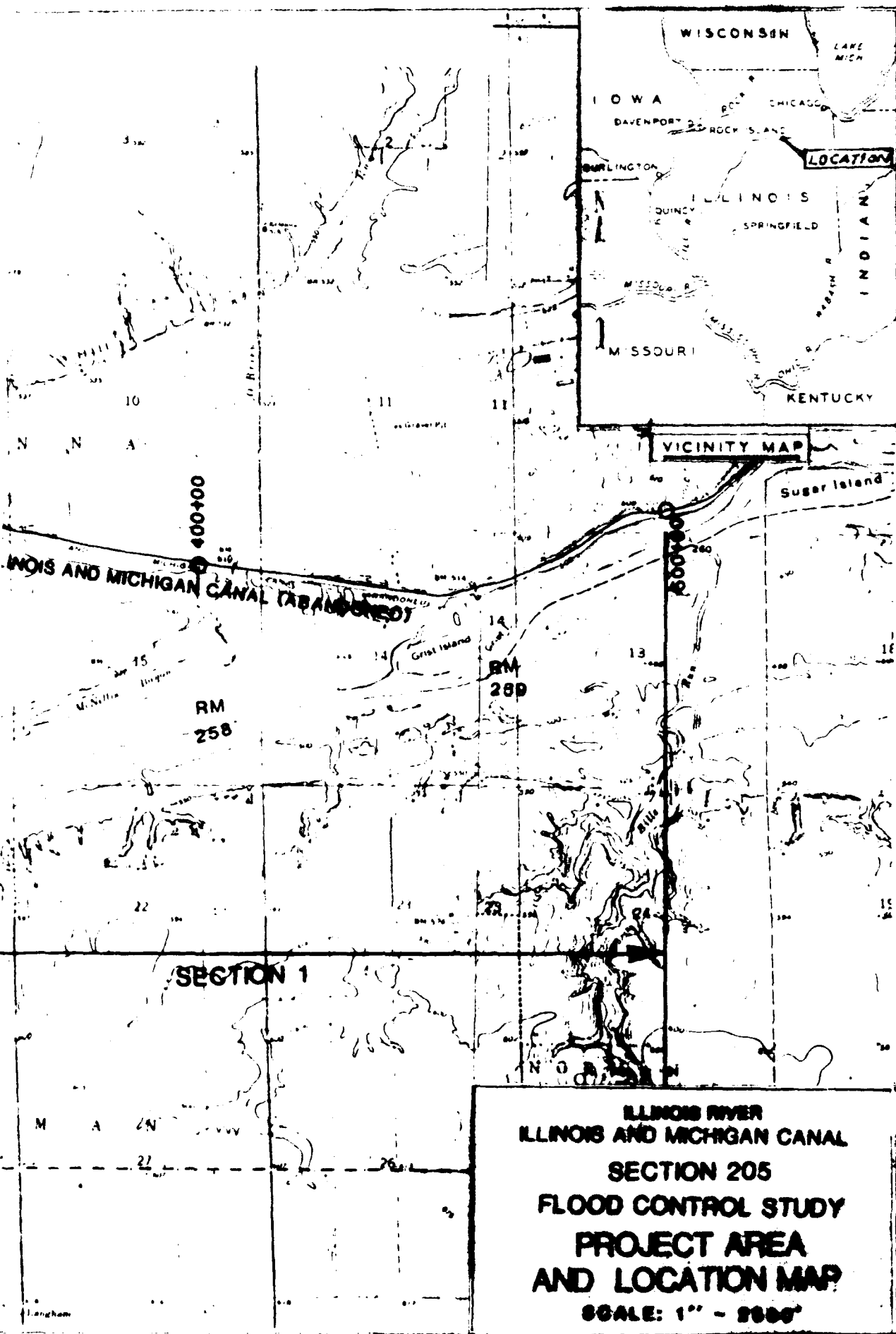
SECTION 3 - RECOMMENDATION

Based on the findings of this reconnaissance report that no flood damage reduction plans are economically feasible, I recommend that the Section 205 study of flood damage reduction measures along the Illinois and Michigan Canal between Illinois River Miles 250.0 and 260.5 be terminated.

Charles R. 
Dudley M. Hanson, P.E.
Chief, Planning Division *for*



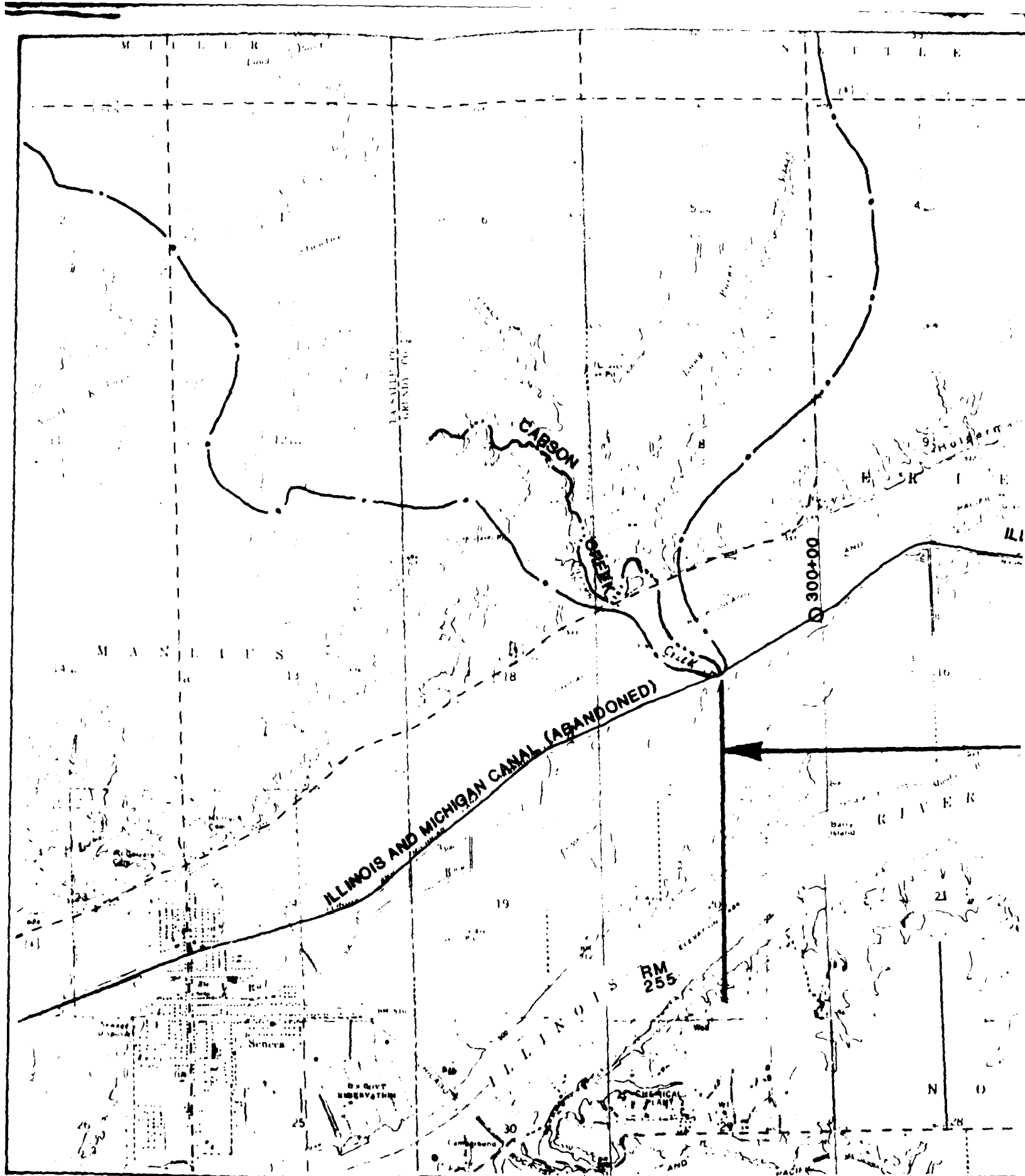




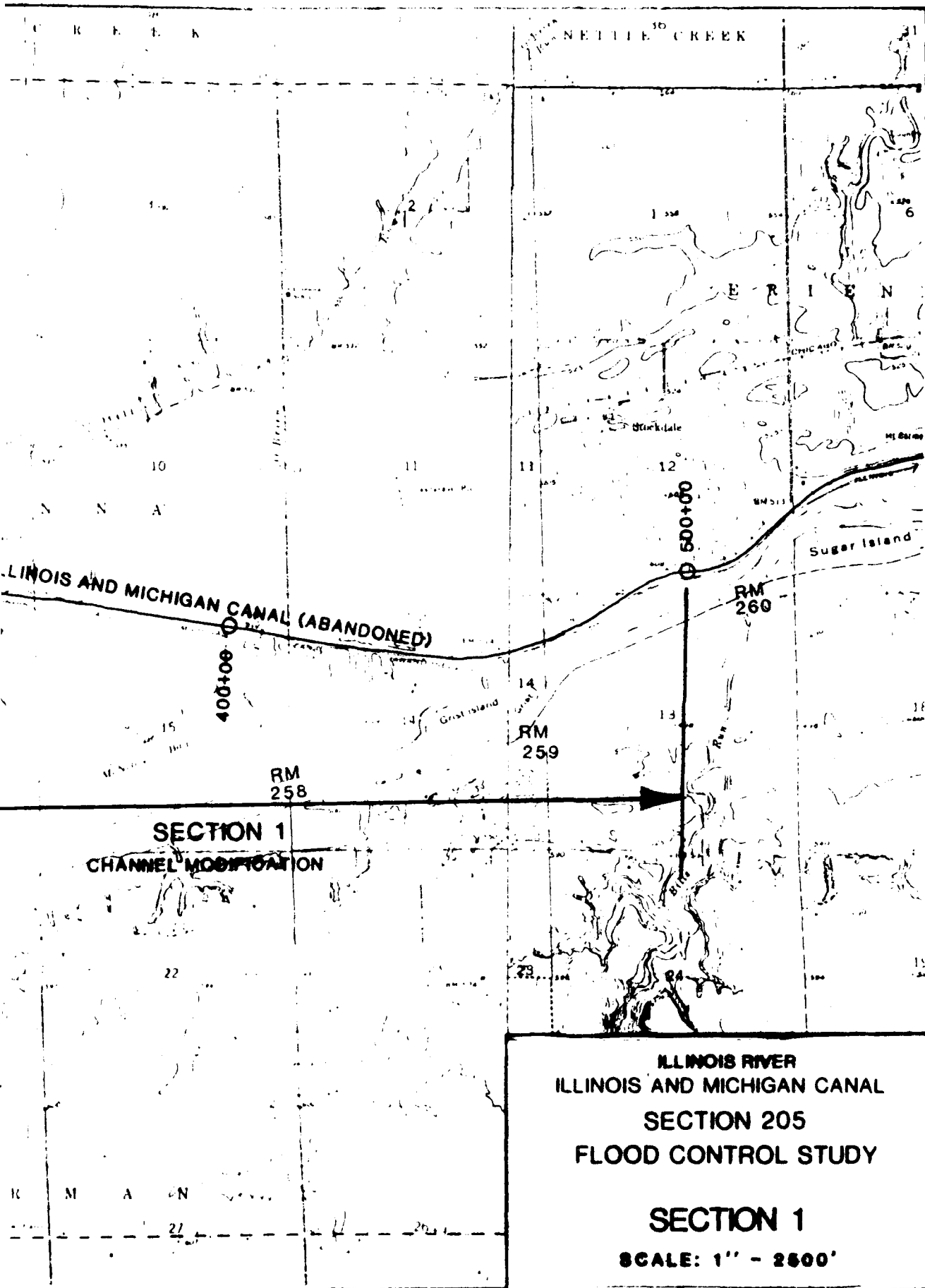
ILLINOIS RIVER
ILLINOIS AND MICHIGAN CANAL
SECTION 205
FLOOD CONTROL STUDY
PROJECT AREA
AND LOCATION MAP

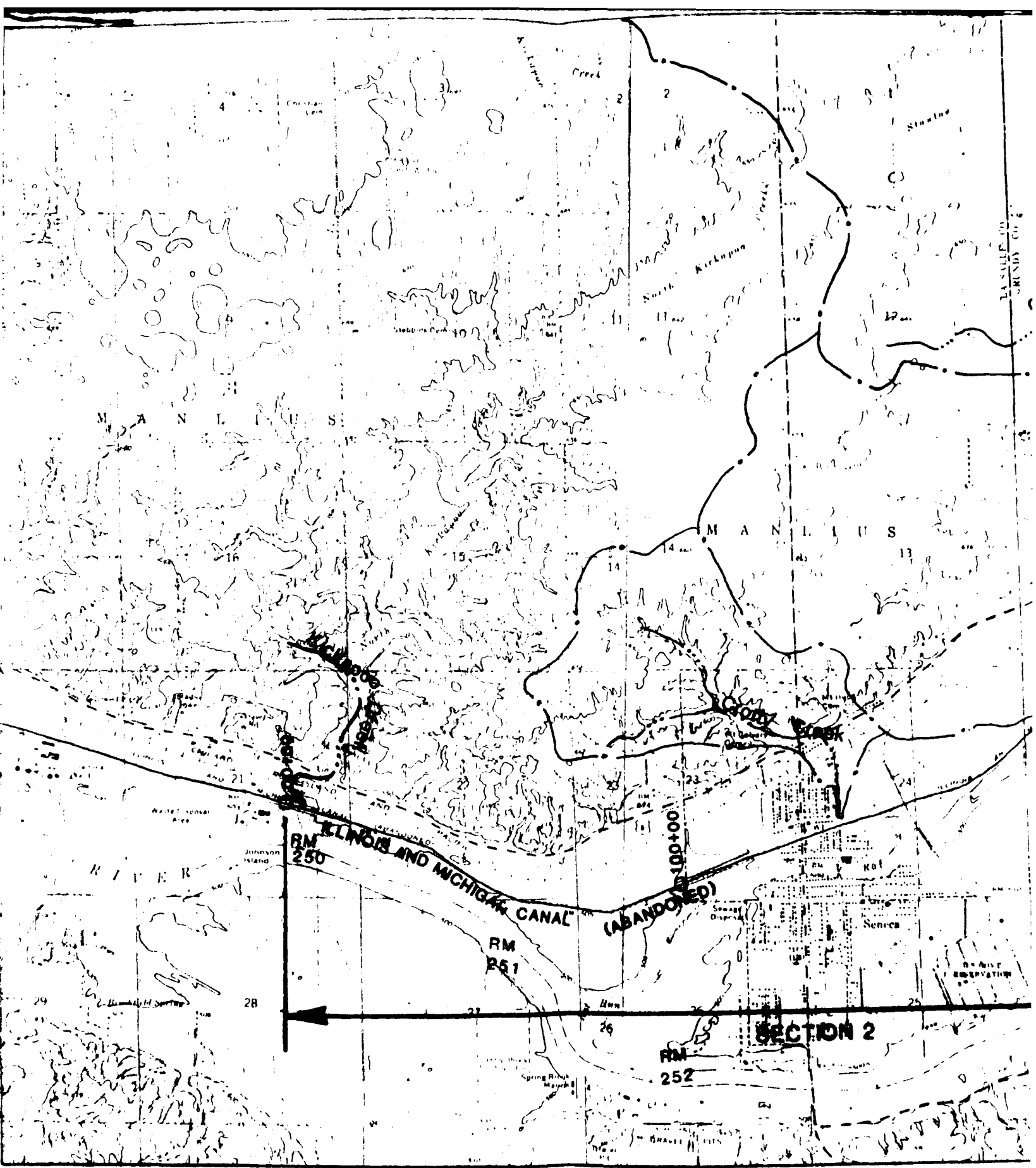
SCALE: 1" - 2000'

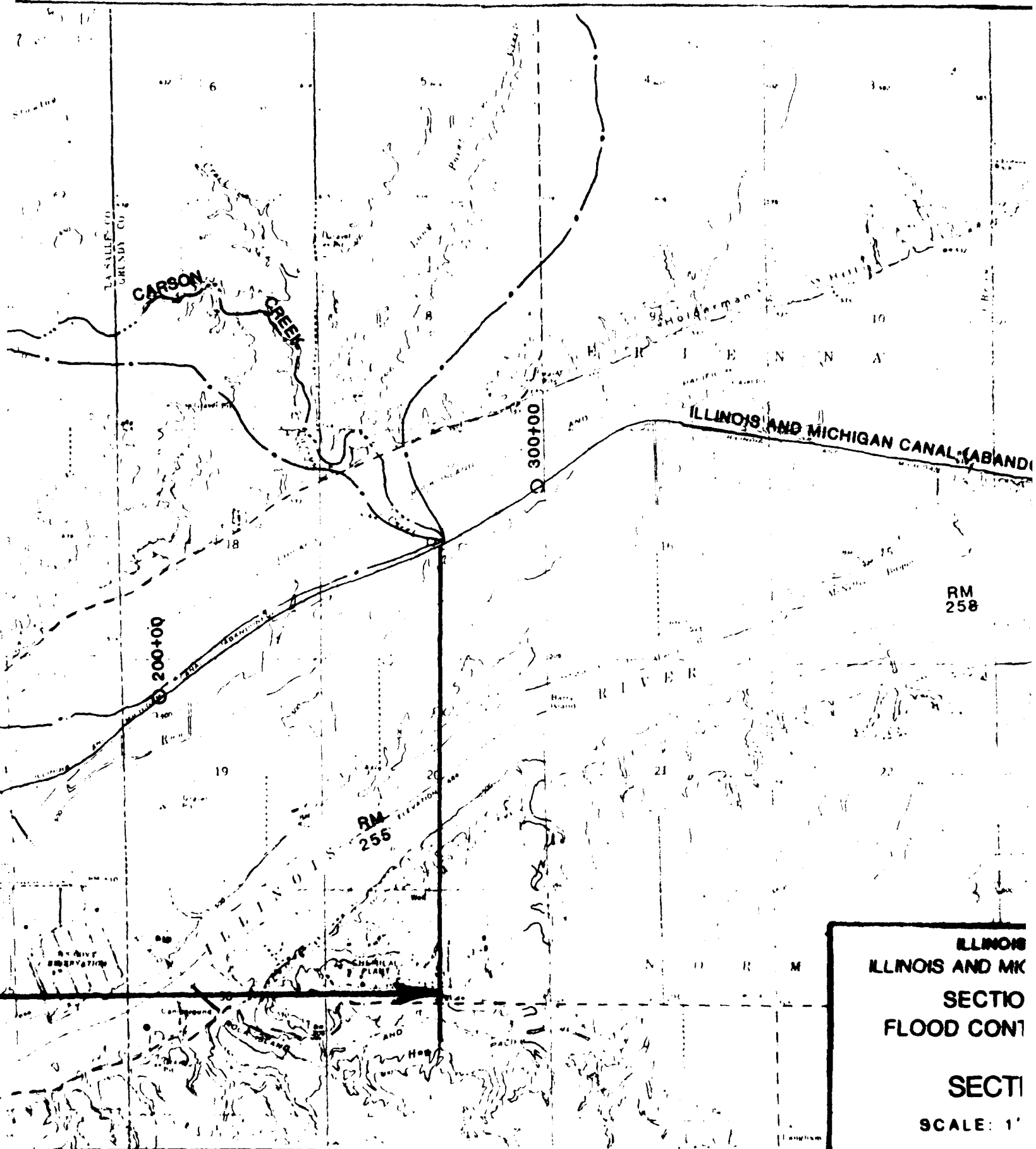
PLATE 1



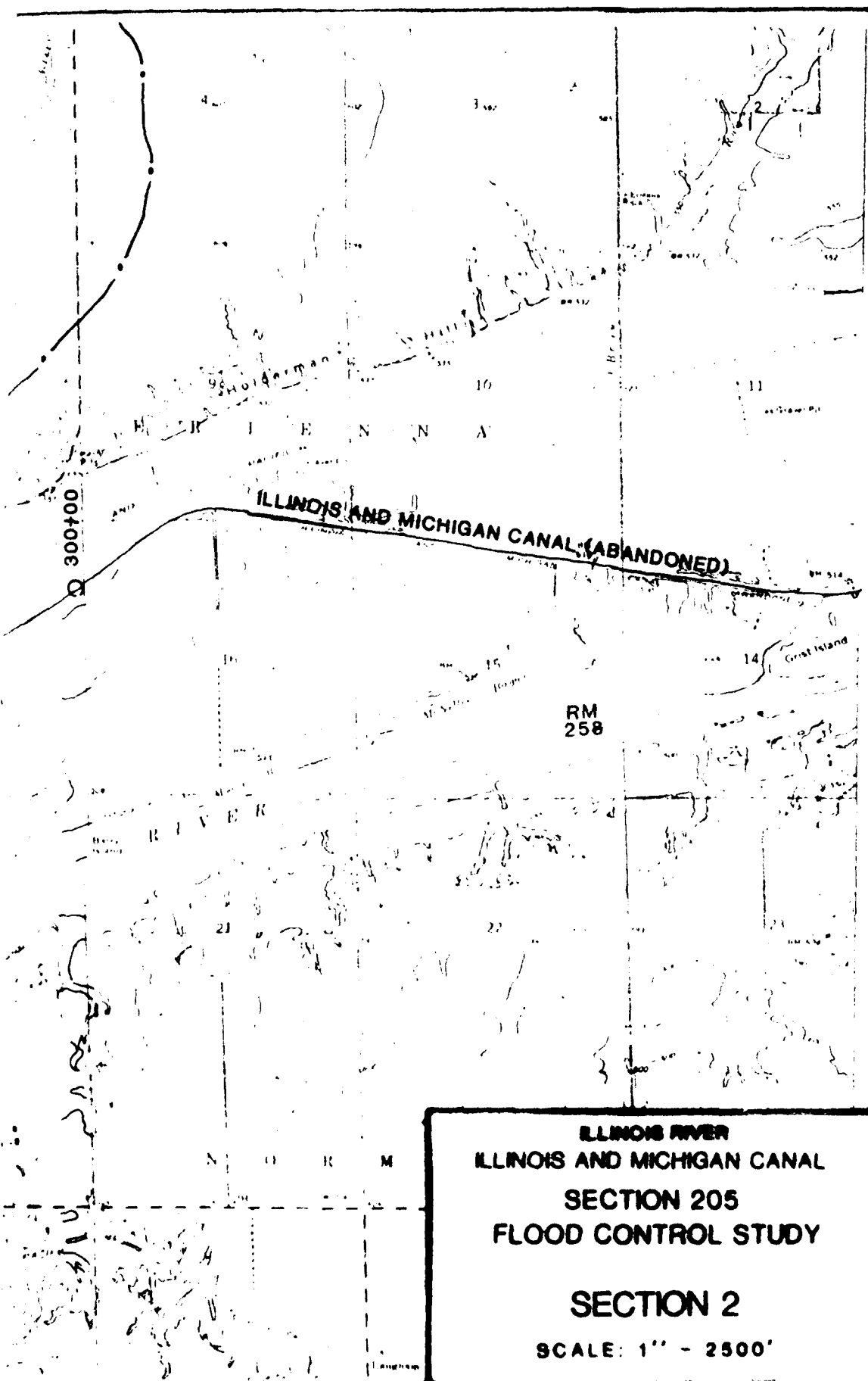
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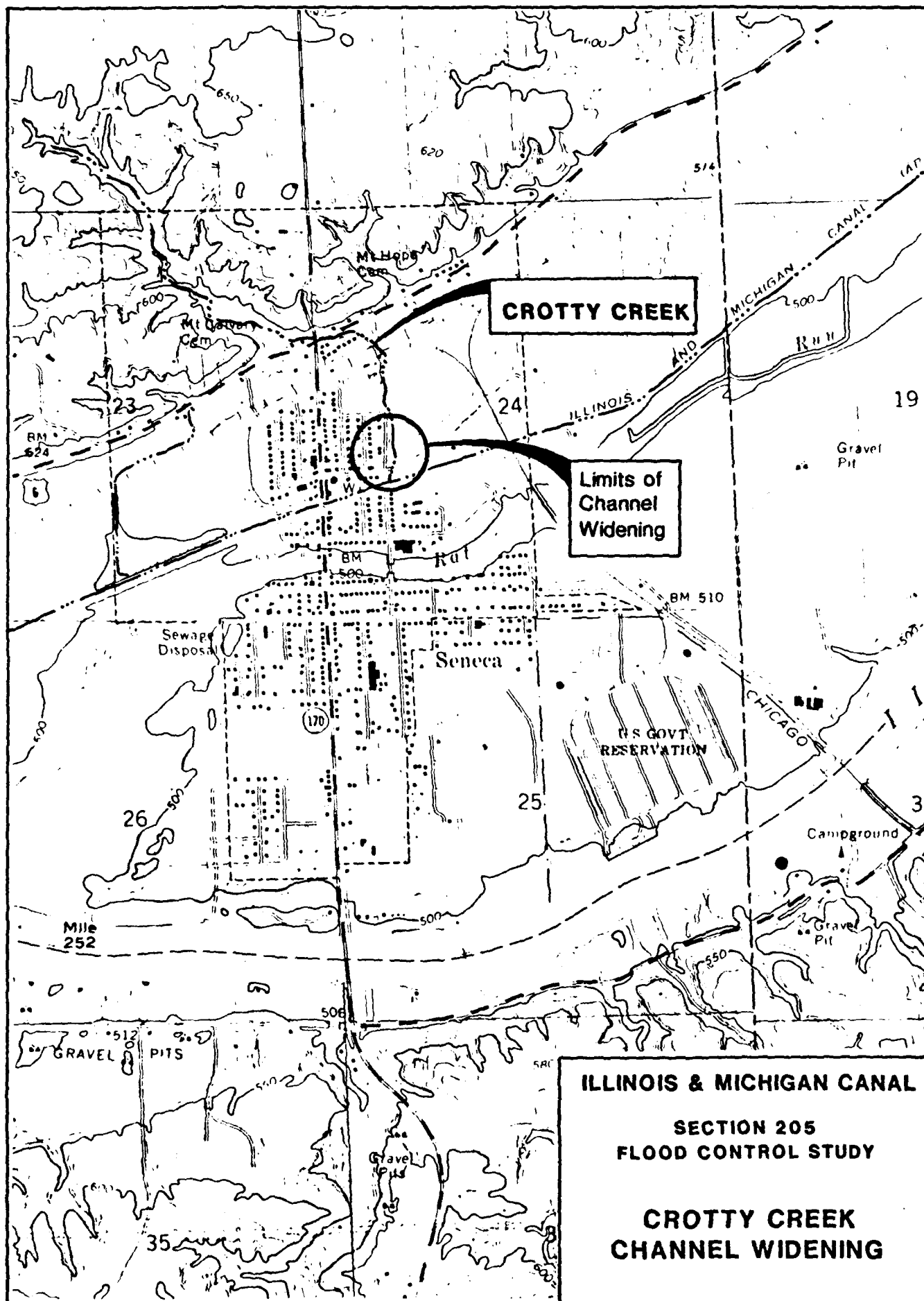
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**ILLINOIS RIVER
ILLINOIS AND MICHIGAN CANAL
SECTION 205
FLOOD CONTROL STUDY**

SECTION 2

SCALE: 1'' - 2500'



HYDROLOGY AND HYDRAULICS

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RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

APPENDIX A
HYDROLOGY AND HYDRAULICS

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| A-2 | Discharge Frequency, Crotty Creek at Mouth |
| A-3 | Carson Creek Water Surface Profiles |
| A-4 | Crotty Creek Water Surface Profiles |

RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

APPENDIX A
HYDROLOGY AND HYDRAULICS

STUDY AREA DESCRIPTION

The study area includes the Illinois and Michigan Canal (I&M Canal) along the north bank of the Illinois River between river miles 250.0 and 260.5. (See plate 1 - main report.) Carson Creek enters the canal at river mile 256.0 (Illinois River miles) where it outlets directly to the Illinois River through a new 6-by 10-foot box culvert and an overflow spillway (Waupecan Island Spillway). A barrier dam has been constructed at each end of the canal between Carson Creek and this outlet in an attempt to isolate this reach from the rest of the waterway.

Crotty Creek, the other stream, enters the canal in the town of Seneca at river mile 250.0 where it outlets to the Illinois River through two 72-inch corrugated metal pipe (CMP) culverts. Several other streams in the study reach pass under the I&M Canal through culverts or inverted siphons. These streams include O'Brien Run, Holderman Creek, Rat Run Creek, local drainage at Brown's Culvert, and the 36-inch CMP west of Seneca.

WATERSHED DESCRIPTION

Carson Creek and its two major tributaries, Stanton Creek and Long Point Creek, drain a watershed area of 8.9 square miles. The average stream slope of the Carson Creek watershed is 21.6 feet per mile, with the upper half of the basin being relatively flat, compared to the steep bluffs found in the lower watershed. Land use is mainly agricultural and pastoral, with some steeper portions being forested. Soils in the upper portions of the basin consist of loess over a silty clay glacial till.

Crotty Creek drains a watershed area of 0.99 square mile. The average stream slope of the Crotty Creek watershed is 74.1 feet per mile. The majority of the basin is steep and forested, although portions of the upper and lower fringes are farmed. Soils in the Crotty Creek watershed are similar to those in the Carson Creek watershed. Although Crotty Creek does not meet the minimum drainage or discharge requirements, analysis of the area

does provide valuable information on estimating drainage versus discharge relationships. Crotty Creek also plays an important part in the solution to the flooding problem.

DISCHARGE FREQUENCY

Discharge-frequency curves for both watersheds were computed by the Illinois Department of Transportation, Division of Water Resources. Discharges for Carson Creek were computed by using the Clark Unit Hydrograph and applying hypothetical rainfall determined from the Illinois State Water Survey, Technical Letter Number 13 for a 24-hour duration storm. Rainfall was distributed using the Illinois State Water Survey's 3rd Quartile Curve. The discharge-frequency curve for Carson Creek described above is shown on plate A-1. Discharge-frequency estimates for Crotty Creek were made using the Illinois State Regression Equations. The discharge-frequency curve for Crotty Creek is shown on plate A-2.

WATER SURFACE PROFILES

The water surface profiles for Section 1 were computed by the Illinois Department of Transportation, Division of Water Resources. The existing and proposed conditions were taken from plans 5B and 6B of reference 1. State water surface profiles for Section 2 were obtained from a computerized backwater model. The surveyed cross-section data were obtained from the Illinois Department of Transportation, Division of Water Resources. The hydraulic model was modified to reflect the proposed channel improvement.

State water surface profile plots for Sections 1 and 2 are shown on plates A-3 and A-4, respectively.

CURRENT FLOOD PROBLEMS

Flood problems in the study reach of the I&M Canal occur when the channel fills up and overtops its banks, damaging agricultural land and commercial and residential properties. Overtopping of the canal banks is caused by two major problems:

- a. Excessive siltation and vegetation in the canal reduces channel capacity and conveyance.
- b. Inadequate outlets from the I&M Canal to the Illinois River create a backwater effect.

Local runoff entering from the north drains freely into the canal in many areas where the berm path is degraded. As rainfall volume increases, drainage which was designed to go under the canal at O'Brien Run, Holderman Creek, and Rat Run Creek ponds to a level of sufficient height to enter the canal from the north, thereby adding more runoff to the already inadequate channel. Carson Creek drainage, which is intended to flow toward the Waupecan Island Spillway site (river mile 255.5), backs up and overtops the berm path west of the barrier dam and therefore flows in the opposite direction. The canal is confined on the south side by an undulating grade which allows water to over-spill low areas in the embankment. Local drainage water also ponds to the north of the canal. The total drainage area entering the canal in the study reach is difficult to determine due to the complex nature of the drainage in this area.

Before the 6- by 10-foot box culvert was installed next to the Waupecan Island Spillway in 1984, flooding between river miles 256 and 260 occurred almost yearly. A study by the Illinois Department of Transportation, Division of Water Resources, shows that this improvement protects land adjacent to the canal up to the 10-year flood frequency without serious overtopping of the existing banks.

Problems between river miles 250 and 256 are intensified because Crotty Creek drainage enters at a 90 degree angle to the canal and immediately flows through a culvert under Commerce Street. This condition reduces hydraulic efficiency.

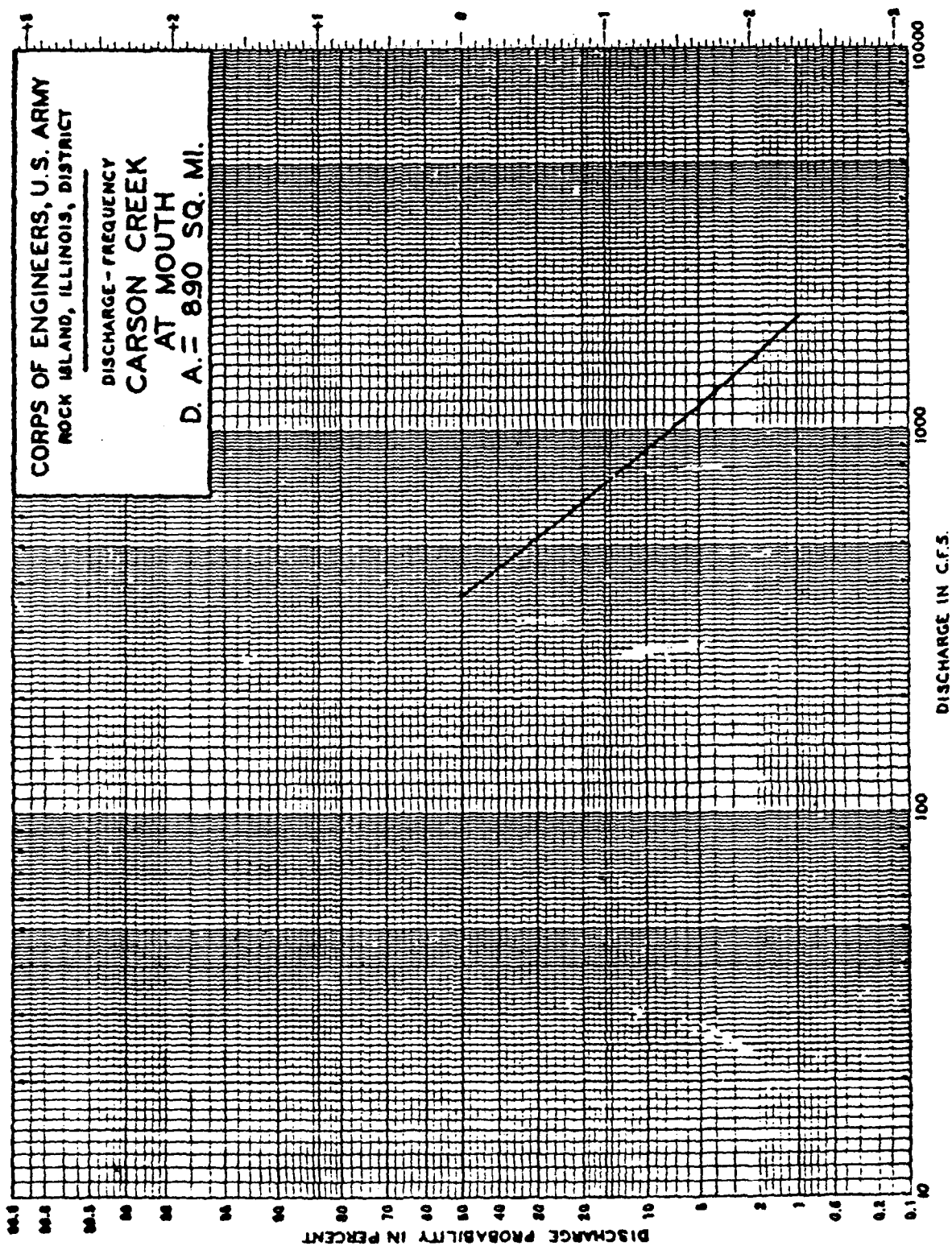
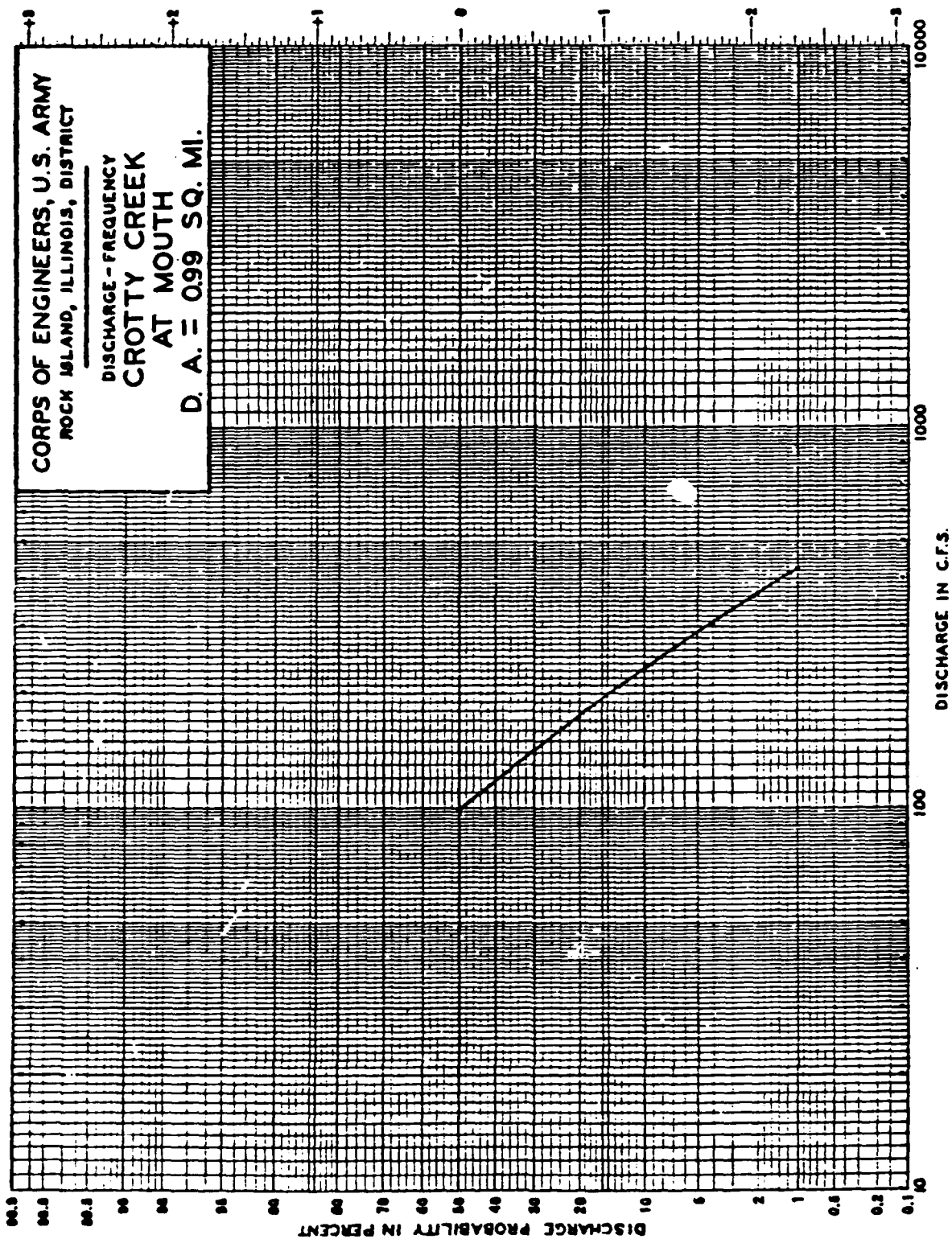
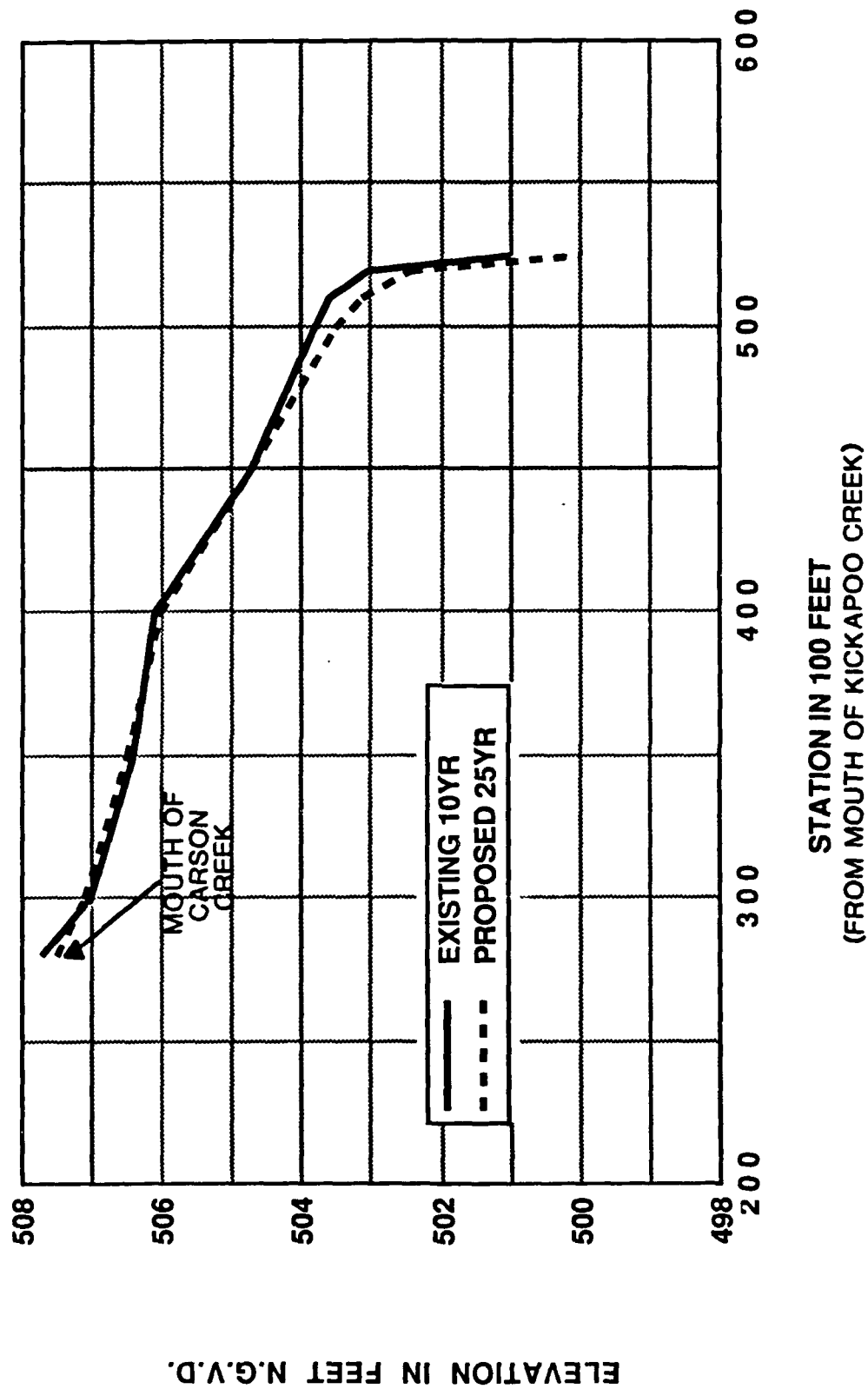


PLATE A-1

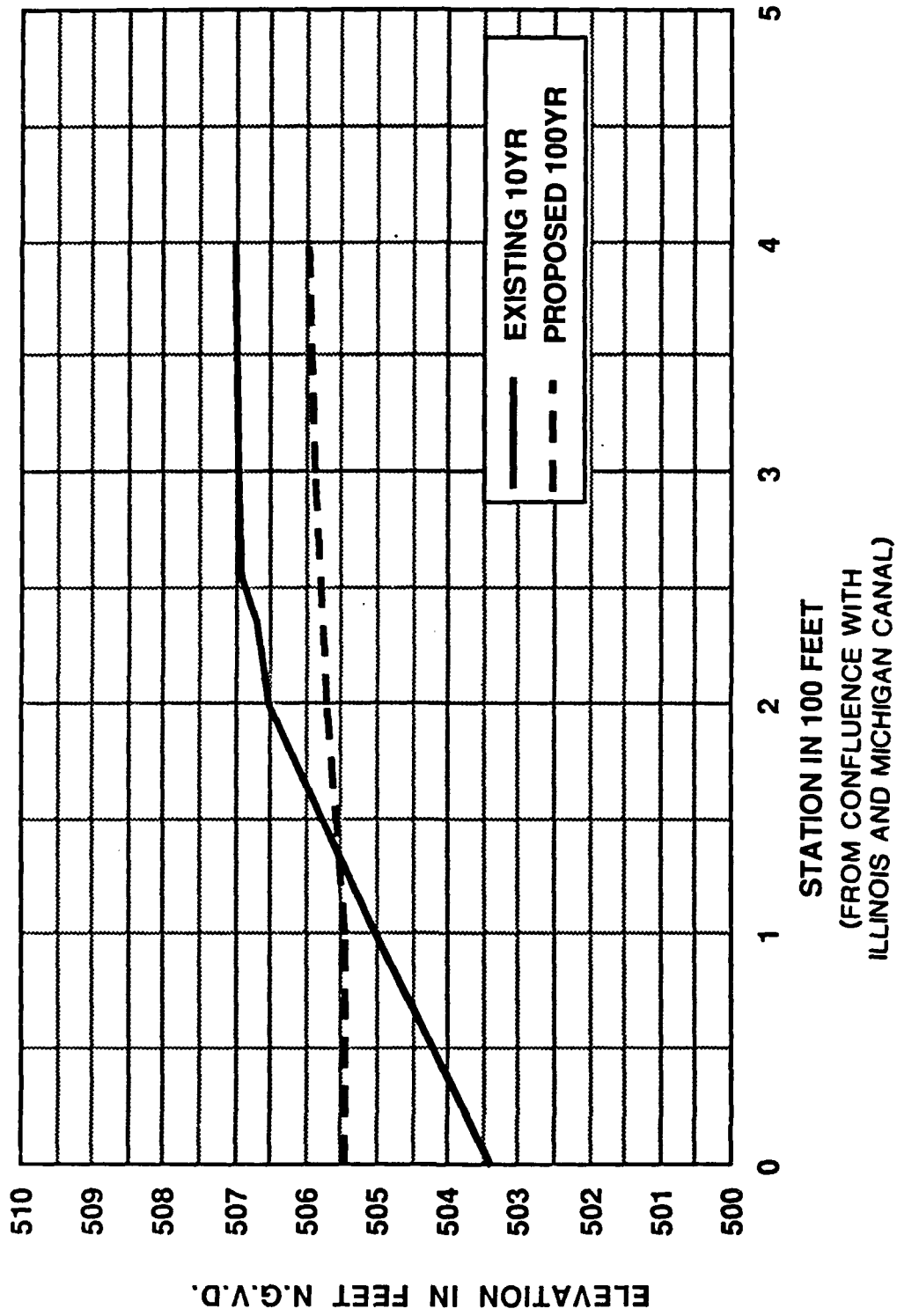


**ILLINOIS & MICHIGAN CANAL
CARSON CREEK TO WAUPECAN ISLAND**



ILLINOIS & MICHIGAN CANAL

CROTTY CREEK HYDRAULIC PROFILES



DETAILED COST ESTIMATES

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PLAN A

Channel Modification
Remove 60,000 Cubic Yards
(Oct 1988 Price Levels)

| <u>Item</u> | <u>Quantity</u> | <u>Unit</u> | <u>Unit Price(\$)</u> | <u>Cost(\$)</u> |
|---|-----------------|-----------------|-----------------------|-----------------|
| Lands, Easements, Rights-of-Way & Disposal Areas (9 sites of 0.9 acre each) | | | | |
| Clear Disposal Areas (Medium Clearing) | 8.1 | ac | 3,200.00 | 25,920 |
| Clearing along Tow & Berm Paths (Medium to Heavy) | 11.9 | ac | 5,100.00 | 60,690 |
| Channel Cleanout | 60,000 | yd ³ | 4.00 | 240,000 |
| Rebuild Slope of Tow and Berm Paths | 48,000 | yd ³ | 5.00 | 240,000 |
| Seeding | 16.4 | ac | 1,650.00 | 27,060 |
| Bridge Removal and Replacement | 1 | job | sum | <u>60,000</u> |
| Subtotal | | | | 653,670 |
| Contingencies (25 percent) | | | | <u>163,417</u> |
| Subtotal | | | | 817,000 |
| Engineering and Design (8 percent) | | | | 65,000 |
| Supervision and Administration (6 percent) | | | | <u>49,000</u> |
| TOTAL | | | | 931,000 |

PLAN A

Channel Modification
Remove 30,000 Cubic Yards
 (Oct 1988 Price Levels)

| <u>Item</u> | <u>Quantity</u> | <u>Unit</u> | <u>Unit Price(\$)</u> | <u>Cost(\$)</u> |
|---|-----------------|-----------------|-----------------------|-----------------|
| Lands, Easements, Rights-of-Way & Disposal Areas (9 sites of 0.9 acre each) | | | | |
| Clear Disposal Areas (medium clearing) | 4.5 | ac | 3,200.00 | 14,400 |
| Clearing Along Tow & Berm Paths (medium to heavy) | 11.9 | ac | 5,100.00 | 60,690 |
| Channel Cleanout | 30,000 | yd ³ | 4.00 | 120,000 |
| Rebuild Slope of Tow and Berm Paths | 48,000 | yd ³ | 5.00 | 240,000 |
| Seeding | 16.4 | ac | 1,650.00 | 27,060 |
| Bridge Removal and Replacement | 1 | job | sum | <u>60,000</u> |
| Subtotal | | | | 522,150 |
| Contingencies (25 percent) | | | | <u>130,550</u> |
| Subtotal | | | | 652,700 |
| Engineering and Design (8 percent) | | | | 52,200 |
| Supervision and Administration (6 percent) | | | | <u>39,100</u> |
| TOTAL | | | | 744,000 |

PLAN B

Channel Modification
Crotty Creek
(Oct 1988 Price Levels)

| <u>Item</u> | <u>Quantity</u> | <u>Unit</u> | <u>Unit Price(\$)</u> | <u>Cost(\$)</u> |
|--|-----------------|-----------------|-----------------------|------------------|
| Lands, Easements, Rights-of-Way, & Disposal Areas | | | | |
| Stripping, 6 inches, remove & waste | 389 | yd ³ | 4.15 | 1,614.35 |
| Channel Excavation, remove & waste (1/2-mile haul) | 4,167 | yd ³ | 4.45 | 18,543.15 |
| Replace Existing Channel Crossings | | | | |
| Remove wooden bridge | 1 | job | sum | 1,900.00 |
| New box culverts | 1 | job | sum | 27,900.00 |
| Remove existing CMP's | 1 | job | sum | 900.00 |
| New box culverts | 1 | job | sum | 28,500.00 |
| Seeding | 0.4 | ac | 2,000 | 800.00 |
| Subtotal | | | | 80,157.50 |
| Contingencies (25 percent) | | | | <u>20,042.50</u> |
| Subtotal | | | | 100,200.00 |
| Engineering and Design (10 percent) | | | | 10,000.00 |
| Supervision and Administration (8 percent) | | | | <u>8,000.00</u> |
| TOTAL | | | | 118,200.00 |

ECONOMIC AND SOCIAL ANALYSIS

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RECONNAISSANCE REPORT
FOR
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ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

APPENDIX C
ECONOMIC AND SOCIAL ANALYSIS

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RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS

APPENDIX C
ECONOMIC AND SOCIAL ANALYSIS

SECTION 1 - INTRODUCTION

This appendix documents the economic and social analysis undertaken to determine the feasibility of providing flood damage reduction measures along a 10.5-mile segment of the Illinois and Michigan Canal near Seneca, Illinois. Current damages are caused by recurrent flooding of the Illinois and Michigan Canal. The four parts of this assessment summarize the investigations undertaken by the Rock Island District, U.S. Army Corps of Engineers.

SECTION 2 - STUDY AREA CHARACTERISTICS

This portion of the Economic and Social Analysis describes the study area and its existing conditions in terms of physical characteristics and flood problems.

EXISTING CONDITIONS

The study area is comprised of a 10.5-mile stretch of land along the Illinois and Michigan Canal between Illinois river miles 250 and 260.5. The flooding primarily damages approximately 400 acres of agricultural land and a portion of the village of Seneca, Illinois, in the north central part of the state. The study area includes both residential and agricultural land uses.

DEMOGRAPHIC CONDITIONS

The 1980 population of Seneca was 2,100, while the combined population for the 2-county region (La Salle and Grundy Counties) was 142,500. As illustrated in table C-1, the area has registered a moderate decrease in population since 1970.

HISTORIC FLOODING

No data regarding historic flooding are available.

TABLE C-1

Population Trends - Illinois and Michigan Canal Study Area

P O P U L A T I O N

| <u>Area</u> | <u>1970</u> | <u>1980</u> | (est.) <u>1985</u> | (Proj) <u>1990</u> | % Change in Pop. <u>1980-90</u> |
|-------------------|-------------|-------------|-----------------------|-----------------------|---------------------------------------|
| Seneca, IL | 1,800 | 2,100 | unavailable | unavailable | --- |
| Grundy County | 26,500 | 30,500 | 31,300 | 31,800 | +4.3 |
| La Salle County | 111,400 | 112,000 | 108,800 | 106,300 | -5.1 |
| Two-County Region | 137,900 | 142,500 | 140,100 | 138,100 | -3.1 |

Sources:

1980 Census of Population, PC80-1-A15, Illinois, U.S. Department of Commerce, Bureau of the Census.

REZIDE, the National Encyclopedia of Residence, ZIP Code Demography 1980 and 1983, Claritas Corp.

Illinois Population Trends from 1980-2025, State of Illinois, Bureau of the Budget.

MOST PROBABLE FUTURE CONDITION

The most likely future condition of the study area (without additional flood protection) will be continued flood problems. Little additional development in the flood plain is anticipated, and no changes in land use are expected.

SECTION 3 - METHODS TO DETERMINE POTENTIAL FLOOD DAMAGE REDUCTION BENEFITS

INTRODUCTION

Rock Island District personnel performed an inventory of the Illinois and Michigan Canal within La Salle and Grundy Counties during the summer of 1988. The field inventory determined land use and structure types, values, and ground and first floor elevations.

The study area floodplain features two land uses: residential and agricultural. Land use and development were used as a basis for dividing the study area into two smaller analysis sections, 1 and 2. Section 1 corresponds to Illinois River miles 260.5 to 255.5. This section contains approximately 400 acres of flood-prone agricultural lands. Section 2 corresponds to Illinois River miles 255.5 to 250.0 and features limited residential development within the floodplain.

SECTION 1

As previously stated, Section 1 features 400 acres of flood-prone agricultural land. A typical monthly production budget for corn and soybeans was used to estimate an average annual damage amount per acre of agricultural land. The budget utilized was modeled after budgets developed by the U.S. Department of Agriculture. Gross cash yield per corn acre was determined from an expected yield of 135 bushels multiplied by the normalized price per bushel. A cash yield of \$261.90 would result without price supports (\$1.94 per bushel, Oct 88 prices), while a cash yield of \$351.00 would result with the inclusion of subsidies (\$2.60 per bushel, Oct 88 prices). Gross cash yield per soybean acre was calculated assuming an expected yield of 41.8 bushels. A cash yield of \$196.88 would result without price subsidies (normalized

price per bushel = \$4.71, Oct 88); a cash yield of \$232.41 would result with subsidies (normalized price per bushel = \$5.56, Oct 88).

Monthly fixed and variable costs were used to calculate the damageable value for corn and soybean crops in the project area. It was assumed that acreage would be replanted with corn or soybeans after a flood event, when local practices and cropping patterns allow. Reductions or loss of cash yields, as well as replanting costs, were estimated as appropriate. Tables C-2 and C-3 summarize estimated crop losses from flooding by month, with and without agricultural price subsidies. As indicated, no crop damages were assumed for January, February, or December floods. The damage weighting factors represent the percent of total runoff occurring in the study area.

The cropping pattern in the study area was estimated at 50 percent corn and 50 percent soybeans, based on the Illinois Agricultural Statistics Annual Summary - 1987, Bulletin 87.1. This crop mix equates to a per acre damageable estimate of \$113.32 without price supports ($\$125.39 \times 50\% + \$101.25 \times 50\% = \$113.32$) or \$148.27 with price supports ($\$176.48 \times 50\% + \$120.05 \times 50\% = \$148.27$).

TABLE C-2

Crop Acre Damages by Month
(with agricultural price supports)
October 88 Prices

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|------------------------|------|------|------|------|-------|--------|--------|--------|--------|--------|-------|------|----------|
| | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ----- |
| CORN | | | | | | | | | | | | | |
| Expense/crop loss (\$) | 0.00 | 0.00 | 2.35 | 7.17 | 32.28 | 257.10 | 309.43 | 309.93 | 310.43 | 276.54 | 50.57 | 0.00 | |
| Damage Factor (%) | 3.4 | 4.3 | 7.8 | 7.9 | 11.8 | 13.9 | 15.8 | 11.8 | 10.3 | 7.1 | 3.9 | 2.1 | |
| Weighted Damage (\$) | 0.00 | 0.00 | 0.18 | 0.55 | 3.87 | 32.96 | 48.89 | 36.97 | 31.97 | 19.63 | 1.92 | 0.00 | \$176.48 |
| SOYBEANS | | | | | | | | | | | | | |
| Expense/crop loss (\$) | 0.00 | 0.00 | 1.79 | 9.27 | 11.94 | 124.14 | 215.62 | 216.12 | 216.61 | 205.53 | 34.2 | 0.00 | |
| Damage Factor (%) | 3.4 | 4.3 | 7.8 | 7.9 | 11.8 | 13.9 | 15.8 | 11.8 | 10.3 | 7.1 | 2.8 | 2.1 | |
| Weighted Damage (\$) | 0.00 | 0.00 | 0.14 | 0.73 | 4.15 | 17.26 | 34.07 | 22.50 | 22.31 | 14.59 | 1.3 | 0.00 | \$120.05 |

TABLE C-3

Crop Acre Damages by Month
(without agricultural price supports)
October 88 Prices

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|------------------------|------|------|------|------|-------|--------|--------|--------|--------|--------|-------|------|--------|
| | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CORN | | | | | | | | | | | | | |
| Expense/Crop Loss (\$) | 0.00 | 0.00 | 2.35 | 7.17 | 19.91 | 167.55 | 220.33 | 220.83 | 221.33 | 196.35 | 37.21 | 0.00 | |
| Damage Factor (%) | 3.40 | 4.30 | 7.60 | 7.90 | 11.80 | 13.90 | 15.80 | 11.80 | 10.30 | 7.10 | 3.80 | 2.10 | |
| Weighted Damage (\$) | 0.00 | 0.00 | 0.18 | 0.55 | 2.35 | 23.29 | 34.81 | 26.06 | 22.80 | 13.94 | 1.41 | 0.00 | 125.39 |
| SOYBEANS | | | | | | | | | | | | | |
| Expense/Crop Loss (\$) | 0.00 | 0.00 | 1.79 | 9.27 | 10.16 | 108.16 | 180.09 | 180.59 | 181.08 | 173.55 | 28.99 | 0.00 | |
| Damage Factor (%) | 3.40 | 4.30 | 7.60 | 7.90 | 11.80 | 13.90 | 15.80 | 11.80 | 10.30 | 7.10 | 3.80 | 2.10 | |
| Weighted Damage (\$) | 0.00 | 0.00 | 0.14 | 0.73 | 3.52 | 15.03 | 28.45 | 21.31 | 18.65 | 12.32 | 1.10 | 0.00 | 101.25 |

Table C-4 lists existing agricultural damages by flood frequency, with and without price supports.

TABLE C-4

Section 1. Existing Agricultural Damages
With and Without Price Supports.
October 1988 Price Levels

| Flood Frequency | Crops Acres Flooded | Existing Agricultural Damage | |
|--------------------|---------------------------|--------------------------------------|-----------------------------------|
| | | Without Price Supports (\$) | With Price Supports (\$) |
| 0.5 | 0 | 0 | 0 |
| 0.2 | 0 | 0 | 0 |
| 0.1 | 300 | 34,000 | 44,400 |
| 0.05 | 300 | 34,000 | 44,400 |
| 0.02 | 300 | 34,000 | 44,400 |
| 0.01 | 400 | 45,300 | 59,400 |
| 0.005 | 400 | 45,300 | 59,400 |
| 0.002 | 400 | 45,300 | 59,400 |
| 0.001 | 400 | 45,300 | 59,400 |

SECTION 2

Section 2 includes 18 single or multi-family dwellings within the floodplain. These structures have an average market value of \$37,000, and include one duplex and one four-plex. Elevation-damage relationships for the affected residential structures were developed using data gathered during the field inventory and the Rock Island District's standard depth/damage computer program. Table C-4 presents existing residential damages by flood frequency.

TABLE C-5

Section B. Existing Residential Damages
October 1988 Price Levels

Existing Residential Damages

| <u>Flood Frequency</u> | <u>Structure (\$)</u> | <u>Contents (\$)</u> | <u>Total Damage (\$)</u> |
|------------------------|-----------------------|----------------------|--------------------------|
| 0.5 | 0 | 0 | 0 |
| 0.2 | 0 | 0 | 0 |
| 0.1 | 0 | 0 | 0 |
| 0.05 | 3,100 | 1,200 | 4,300 |
| 0.02 | 5,700 | 2,800 | 8,500 |
| 0.01 | 32,300 | 16,100 | 48,400 |
| 0.005 | 32,300 | 16,100 | 48,400 |
| 0.002 | 32,300 | 16,100 | 48,400 |
| 0.001 | 32,300 | 16,100 | 48,400 |

AVERAGE ANNUAL DAMAGES

Average annual damages are the expected value of flood losses for a given year. This section presents an assessment of average annual damages that would be associated with flooding in the Illinois and Michigan Canal study area.

EXISTING DAMAGES

Existing condition average annual damages were computed by integrating depth-damage curves for the two study sections, 1 and 2, with elevation frequency relationships. The resulting damage-frequency relationships were used to estimate average annual

damages for each of the study sections. Table C-6 presents the resulting average annual damage for Sections 1 and 2; average annual damages for Section 1 are shown both with and without price supports for agricultural crops.

FUTURE CONDITIONS

Benefits for future residential growth and increased crop yields were included in this analysis.

Residential Growth

Residential affluence refers to an increase in accumulated housing contents value over time. Based on per capita income projections for the State of Illinois 1/ and La Salle and Grundy Counties, Illinois, 2/ residential content value was projected to increase 3.59 percent annually. Residential content value will, therefore, reach its maximum (75 percent of structural value) after 23 years. Thus, benefits resulting from reductions in damages to residential contents are expected to increase over time in the with-project condition.

Agricultural Production

Future crop yields for La Salle and Grundy Counties were projected using data provided by the U.S. Department of Agriculture and presented in "Analysis Factors Affecting Corn Yields: Projections to 1985," by William Lin and Gregory Davenport, agricultural economists in the National Economics Division of the Economic Research Service. Based on these data, crop yields (corn and soybean combined) in the two-county area were projected to increase at a rate of 1.375 percent for twenty years, followed by a no growth period for the remainder of the project life.

Table C-6 presents annual damages for future growth conditions.

1/ 1985 OBERS, BEA Regional Projections, Volume 1, U.S. Department of Commerce, Bureau of the Census.

2/ Survey of Current Business, Volume 69, No. 4, April 1989, U.S. Department of Commerce, Bureau of the Census.

Table C-6

| Average Annual Damages Illinois and Michigan Canal (8-7/8 Percent Discount Rate, October 1988 Price Levels) (50-Year Project Life) | | | | |
|---|--------------------------|---------------------------|---|--|
| Section 2 Residential | | Section 1 Agricultural | | |
| <u>Year</u> | <u>Structure</u> (\$) | <u>Content</u> (\$) | <u>Without</u> <u>Price Supports</u> (\$) | <u>With</u> <u>Price Supports</u> (\$) |
| 1989 | 800 | 300 | 5,300 | 6,800 |
| 1992 | 800 | 300 | 5,500 | 7,100 |
| 2002 | 800 | 500 | 6,300 | 8,100 |
| 2012 | 800 | 700 | 7,000 | 8,900 |
| 2042 | 800 | 700 | 7,000 | 8,900 |
| Future Conditions | | | | |
| 1989 | 800 | 300 | 5,300 | 6,800 |
| 1992 | 800 | 300 | 5,500 | 7,100 |
| 1992-2042 | 800 | 500 | 6,100 | 7,700 |

AVERAGE ANNUAL BENEFITS

Benefits accruing to the reduction of flood damages are calculated as the difference between "with-project" and "without-project" average annual damages. This section presents an assessment of benefits that would be associated with the reduction of flood damages in the study area.

FLOOD DAMAGE REDUCTION

Table C-7 presents a projection of future benefits for both Section 1 and 2. Table C-8 summarizes the benefits and residual damages for the proposed flood control alternatives. (Residual damages are flood damages which occur even with a flood damage reduction project.)

TABLE C-7

Average Annual Benefits, Illinois and Michigan Canal
(8-7/8 Percent Discount Rate, October 1988 Price Levels)
(50-Year Project Life)

| Year | Section 1 Agricultural | | Section 2 Residential | |
|------|---------------------------|------------------------|--------------------------|---------|
| | Without | With | Structure | Content |
| | Price Supports (\$) | Price Supports (\$) | (\$) | (\$) |
| 1989 | 3,600 | 4,600 | 700 | 300 |
| 1992 | 3,800 | 4,800 | 700 | 300 |
| 2002 | 4,300 | 5,500 | 700 | 500 |
| 2012 | 4,300 | 6,000 | 700 | 700 |
| 2042 | 4,700 | 6,000 | 700 | 700 |

Future Conditions

| | | | | |
|-----------|-------|-------|-----|-----|
| 1989 | 3,600 | 4,600 | 700 | 300 |
| 1992 | 3,800 | 4,800 | 700 | 300 |
| 1992-2042 | 4,100 | 5,200 | 700 | 500 |

Table C-8
Future Conditions, Average Annual Benefits and Damages
(8-7/8 Percent Discount Rate, October 1988 Price Levels)
(50-Year Project Life)

| Category | Level of Protection | Benefits | | | Residual Damage (\$) | Average Annual Damage (\$) |
|---|------------------------|--------------------|--------|-------|----------------------------|-------------------------------------|
| | | Existing (1912) | Future | Total | | |
| | | (\$) | (\$) | (\$) | | |
| Section 2 Residential | 100-Year | 1,000 | 200 | 1,200 | 100 | 1,300 |
| Section 1 Agricultural Damage without price supports | 25-Year | 3,800 | 300 | 4,100 | 2,000 | 6,100 |
| Agricultural Damage with price supports | 25-Year | 4,800 | 400 | 5,200 | 2,500 | 7,700 |

EMPLOYMENT BENEFITS

This section presents an evaluation of benefits that would result from the direct use of otherwise unemployed or underemployed labor resources during project construction.

La Salle and Grundy Counties, Illinois, are areas with substantial and persistent unemployment (see table C-9). These counties, therefore, are eligible to claim employment or redevelopment benefits in Fiscal Year 1989, pursuant to the Area Redevelopment Act (Public Law 87-27).

Employment benefits are based on project construction costs, exclusive of lands and damages, engineering and design, and supervision and administration. It is estimated that 50 percent of the project construction costs would be allocated to on-site labor. These labor costs would be divided between skilled, semi-skilled, and other personnel (with percentage allocations of 50, 40, and 10 percent, respectively).

Construction employment in the La Salle-Grundy County area is generally gained through union membership. Contractors seeking to hire labor contact the local unions involved for a referral list of workers. When contacted, unions refer unemployed workers on a priority basis. Therefore, the local hire rate for all labor categories was estimated at 90 percent. This percentage exceeds Principles and Guidelines standards, but is more realistic in highly unionized areas. For example, during construction of the Clinton, Iowa, Local Flood Protection Project, payroll records and interviews indicated that more than 90 percent of hired labor was from the local area.

The calculations of employment benefits for Sections A and B are detailed in tables C-10 and C-11.

SECTION 1

The amount of wages to be paid to locally unemployed or underemployed workers as a result of Section A project construction would total \$293,800. The resulting employment benefits (\$306,800) was discounted at an 8-7/8 percent interest rate to represent average annual benefits. Annual employment benefits for Section 1 project construction amount to \$27,600.

SECTION 2

The amount of wages to be paid to locally unemployed or under-employed workers as a result of Section A project construction would amount to \$45,100. The resulting employment benefit (\$47,100) was discounted using an 8-7/8 percent discount rate to derive average annual benefits. Annual employment benefits for Section 2 project construction total \$4,200.

TABLE C-9

La Salle and Grundy Counties, Illinois
Annual Unemployment Rates, 1984-1988*

| Annual Unemployment (%) | | | |
|-------------------------|--------------------------|----------------------------|-------------------|
| <u>Year</u> | <u>Grundy County, IL</u> | <u>La Salle County, IL</u> | <u>Nationwide</u> |
| 1984 | 9.9 | 12.3 | 7.5 |
| 1985 | 10.4 | 13.5 | 7.2 |
| 1986 | 9.9 | 11.7 | 7.0 |
| 1987 | 11.3 | 11.7 | 6.2 |
| 1988 | 10.3 | 10.9 | 5.5 |

*Source: Job Service of Illinois, Chicago, Illinois.

TABLE C-10

Section A. Employment Benefits
July 1988 Price Levels, 8-7/8 Percent Discount Rate
50-Year Project Life

A. Estimated On-Site Labor Costs:

| | |
|-------------------|---------------|
| Construction Cost | \$652,700 |
| Percent to Labor | <u>x 0.50</u> |
| | \$326,400 |

B. Allocation of On-Site Labor Costs by Category:

| <u>Labor Category</u> | <u>On-Site Labor Costs (\$)</u> | <u>Percent Allocation</u> | <u>Amount of Wages (\$)</u> |
|-----------------------|---------------------------------|---------------------------|-----------------------------|
| Skilled | 326,400 | 40 | 130,500 |
| Semi-Skilled | 326,400 | 50 | 163,200 |
| Other | 326,400 | 10 | 32,600 |

C. Allocation of Wages to Locally Unemployed or Underemployed:

| <u>Labor Category</u> | <u>Amount of Wages (\$)</u> | <u>Percent to Locally Unemployed/Underemployed Labor</u> | <u>Wages to Previously Unemployed/Underemployed Labor (\$)</u> |
|-----------------------|-----------------------------|--|--|
| Skilled | 130,600 | 90 | 117,500 |
| Semi-Skilled | 163,200 | 90 | 146,900 |
| Other | <u>32,600</u> | 90 | <u>29,300</u> |
| | 326,400 | | 293,800 |

D. Benefit Computation:

| <u>Year</u> | <u>Local Wage Amount (\$)</u> | <u>Periods to Base Year</u> | <u>Future Value of \$1.00</u> | <u>Local Wage Value in Base Year</u> |
|--|-------------------------------|-----------------------------|-------------------------------|--------------------------------------|
| 1 | | | | |
| TOTAL | 293,800 | 1 | 1.04438 | \$306,800 |
| Amortized at 8-7/8 Percent, 50-Year Project Life | | | | <u>x0.09003</u> |
| Annual Employment Benefit | | | | \$ 27,600 |

TABLE C-11

Section B, Employment Benefits
July 1988 Price Levels, 8-7/8 Percent Discount Rate
50-Year Project Life

A. Estimated On-Site Labor Costs:

| | |
|-------------------|---------------|
| Construction Cost | \$100,200 |
| Percent to Labor | <u>x 0.50</u> |
| | \$ 50,100 |

B. Allocation of On-Site Labor Costs by Category:

| <u>Labor Category</u> | <u>On-Site Labor Costs (\$)</u> | <u>Percent Allocation</u> | <u>Amount of Wages (\$)</u> |
|-----------------------|---------------------------------|---------------------------|-----------------------------|
| Skilled | 50,100 | 40 | 20,000 |
| Semi-Skilled | 50,100 | 50 | 25,100 |
| Other | 50,100 | 10 | 5,000 |

C. Allocation of Wages to Locally Unemployed or Underemployed:

| <u>Labor Category</u> | <u>Amount of Wages (\$)</u> | <u>Percent to Locally Unemployed/Underemployed Labor</u> | <u>Wages to Previously Unemployed/Underemployed Labor (\$)</u> |
|-----------------------|-----------------------------|--|--|
| Skilled | 20,000 | 90 | 18,000 |
| Semi-Skilled | 25,100 | 90 | 22,600 |
| Other | <u>5,000</u> | 90 | <u>4,500</u> |
| | 50,100 | | 45,100 |

D. Benefit Computation:

| <u>Year</u> | <u>Local Wage Amount (\$)</u> | <u>Periods to Base Year</u> | <u>Future Value of \$1.00</u> | <u>Local Wage Value in Base Year</u> |
|--|-------------------------------|-----------------------------|-------------------------------|--------------------------------------|
| 1 | | | | |
| TOTAL | 45,100 | 1 | 1.04438 | \$47,100 |
| Amortized at 8-7/8 Percent, 50-Year Project Life | | | | <u>x0.09003</u> |
| Annual Employment Benefit | | | | \$ 4,200 |

TABLE C-12

Benefit-to-Cost Summary
 Illinois and Michigan Canal, Existing Conditions
 (8-7/8 Percent Discount Rate)
 (October 88 Price Levels, 50-Year Project Life)

| | Level of Protection | Annual Benefits (\$) | Annual Charges (\$) | Net Annual Benefits (\$) | Benefit-to- Cost Ratio |
|--------------------------------|------------------------|-------------------------|------------------------|-----------------------------|---------------------------|
| Section 1, Plan A | | | | | |
| Remove 30,000 yds ³ | 25-year | 32,800 | 73,000 | 0 | 0.45 |
| with price supports | 25-year | 31,700 | 73,000 | 0 | 0.43 |
| Section 1, Plan B | | | | | |
| Remove 60,000 yds ³ | 25-year | 32,800 | 91,500 | 0 | 0.36 |
| with price supports | 25-year | 31,700 | 91,500 | 0 | 0.35 |
| Section 2 | 100-year | 5,400 | 12,100 | 0 | 0.45 |

TABLE C-13

Annual Cost Analysis, Existing Conditions
 Illinois and Michigan Canal
 (8-7/8 Percent, October 88 Price Levels, 50-Year Project Life)

| | Level of Protection | Cost Estimate (\$) | Interest During Construction (\$) | Total First Cost (\$) | Annual Costs (\$) | Annual O&M (\$) | Total Annual Cost (\$) |
|----------------------|------------------------|-----------------------|--------------------------------------|--------------------------|----------------------|--------------------|---------------------------|
| Section 1 | | | | | | | |
| Plan A remove 30,000 | 25 | 744,000 | 33,000 | 777,000 | 70,000 | 3,000 | 73,000 |
| Plan B remove 60,000 | 25 | 931,000 | 41,300 | 972,300 | 87,500 | 4,000 | 91,500 |
| Section 2 | 100 | 118,200 | 5,200 | 123,400 | 11,100 | 1,000 | 12,100 |

SECTION 4 - SUMMARY OF BENEFIT-COST ANALYSIS

BENEFIT-COST ANALYSIS

Table C-12 presents a summary of the benefit-cost analysis for 25-year protection of Section 1, with and without agricultural price supports, and for 100-year protection of Section 2.

AVERAGE ANNUAL COST

Construction, operation, and maintenance costs detailed in this assessment are in October 1988 price levels. Interest during construction and annualized costs were computed using an 8-7/8 percent discount rate. A 50-year project life was used for the period of analysis. Table C-13 summarizes the calculation of interest during construction and the annual charges for the channel modification alternatives examined.

RECOMMENDATIONS

As indicated in table C-12, neither channel modification plan is economically justified. Only projects with benefits exceeding costs are considered to be economically feasible for Federal participation. Therefore, Federal participation in a flood control project for the Illinois and Michigan Canal study area is not recommended.

CORRESPONDENCE

A

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**RECONNAISSANCE REPORT
FOR
SECTION 205 FLOOD CONTROL

ILLINOIS AND MICHIGAN CANAL
LA SALLE AND GRUNDY COUNTIES, ILLINOIS**

**APPENDIX D
PERTINENT CORRESPONDENCE**

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| Letter from the Chicago District, Corps of Engineers, to the Rock Island District, Corps of Engineers, dated October 24, 1983 | D-2 |
| Letter from the Chicago District, Corps of Engineers, to the Illinois Department of Conservation, dated October 24, 1983 (enclosure to page D-2) | D-3 |
| Letter from Senator Jerome Joyce, dated December 26, 1983 | D-4 |
| Letter from the Village of Seneca, dated January 19, 1984 | D-5 |
| Notice of Public Meeting, Initial Appraisal Study for Flood Damage Reduction, Illinois and Michigan Canal, Illinois, Rock Island District, Corps of Engineers, dated April 12, 1984 | D-6 |
| Letter from the Illinois Department of Conservation, State Historic Preservation Officer, dated October 26, 1984 | D-8 |
| Planning Aid Letter from United States Department of Interior, Fish and Wildlife Service, dated October 7, 1988 | D-10 |
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Copy of Letter from Illinois Department of Conservation to Field Supervisor of U.S. Fish and Wildlife Service, received November 8, 1988

D-15

Illinois



Department of Conservation

life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62706

CHICAGO OFFICE - ROOM 100, 160 NO. LASALLE 60601

David Kenney, Director • James C. Helfrich, Assistant Director

August 19, 1983

Lt. Col. Christos A. Dovas, P.E.
District Engineer
Department of the Army
Chicago District, Corps of Engineers
219 South Dearborn Street
Chicago, Illinois 60604

Dear Colonel Dovas:

In June the Department received a Public Notice of a "workshop" which we attended regarding the "flooding problems along the Illinois and Michigan Canal." In connection with that workshop, the Department has provided the Corps with specific comments on various known problems where there has been recent or reoccurring overtopping or failure of the floodwalls above Joliet and Lockport which would warrant an investigation of the stability of the McCook Levee.

During and following that public workshop, it was evident that there definitely is a major flooding problem regarding the Illinois River/Illinois and Michigan Canal system; however, it was also quite apparent that the narrow and limited scope of your present study would do little to address the bulk of the flooding and damage problems which have been and will continue to plague the upper Illinois River Waterway and Canal area. In our opinion, this situation could be remedied if this study were to be expanded to encompass the remainder of our Canal facility down to the Peru/LaSalle area.

In recent discussions and conversations with other Department officials and representatives, it is apparent that these agencies are also concerned with the reoccurring flood problems along this stretch of the Illinois River. Therefore, I believe the importance of this study is such that it is imperative that it be enlarged or extended to cover flood problems of the Illinois River and Illinois and Michigan Canal at least as far as the Peru/LaSalle area.

Your review and assistance in extending the project scope would be greatly appreciated.

Sincerely,

David Kenney

DK:TW/RWL:alc

cc: Division of Water Resources
Department of Agriculture
Attorney General's Office, Bill Webber
Environmental Protection Agency
Senator Percy
Senator Dixon



DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

NCCPE-PP

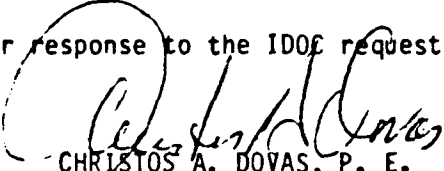
24 OCT 1983

SUBJECT: Request for Flood Control Study on Illinois & Michigan Canal

Commander, Rock Island District

1. Forwarded for your information and response is a request from the Illinois Department of Conservation to undertake a flood control study of the lower reaches of the Illinois & Michigan Canal.

2. Also inclosed is a copy of our response to the IDOC request.


CHRISTOS A. DOVAS, P. E.
LTC, Corps of Engineers
Commanding

Inclosure



DEPARTMENT OF THE ARMY
CHICAGO DISTRICT, CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

24 OCT 1983

Plan Formulation Section

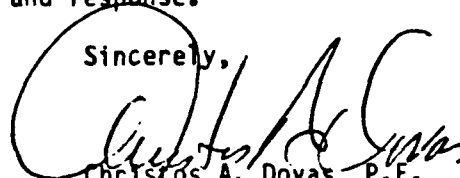
Mr. David Kenney
Director, Illinois Department of Conservation
Lincoln Tower Plaza
524 South Second Street
Springfield, Illinois 62706

Dear Mr. Kenney:

This is in response to your letter of 19 August 1983 concerning our ongoing study of the flooding problems of the Illinois & Michigan Canal. We acknowledge your concerns in regards to the lower reaches of the Canal. However, with respect to your request to extend our study to this area, we are unable to fulfill your request. The reasons we are unable to do so, are that the C-SELM authority limits the study area to flooding problems within the Chicago Metropolitan Area. In addition, the area is located beyond the boundaries of the Chicago District and is within the jurisdiction of the Rock Island District.

A study of the flooding problems that you have identified, could possibly be undertaken by the Rock Island District under the authority of Section 205 of the 1948 Flood Control Act as amended. This authority allows the Corps of Engineers to the initiate and complete small flood control projects without Congressional authorization. This program is limited to a maximum, Federal cost of \$4 million per project. I am therefore forwarding your letter to the District Engineer at Rock Island for their information and response.

Sincerely,


CHRISTOS A. DOVAS, P.E.
LTC, Corps of Engineers
District Engineer

Copy furnished:
District Engineer, Rock Island

329 STATE HOUSE
SPRINGFIELD, IL 62706
217/782-8204

107 S KENNEDY
P.O. BOX 80
BRADLEY, IL 60915
815/939-1661



ILLINOIS STATE SENATE
JEROME J. JOYCE
SENATOR
43RD LEGISLATIVE DISTRICT

COMMITTEES
CHAIRMAN - AGRICULTURE,
CONSERVATION AND ENERGY
MEMBER - ELECTIONS AND
REAPPORTIONMENT
LOCAL GOVERNMENT
EXECUTIVE APPOINTMENTS
AND ADMINISTRATION

December 26, 1983

Bernard P. Slofer
Colonel, Corps of Engineers
District Engineer, U.S. Army
Clock Tower Building
Rock Island, Illinois 61201

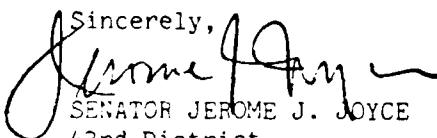
Dear Mr. Slofer:

Thank you for notifying me of the reconnaissance study the Corps of Engineers is undertaking to relieve flood damage along the Illinois and Michigan Canal in LaSalle and Will Counties.

In the past year my district office has fielded complaints from the city engineer in Marseilles, the mayor and village board of Seneca, and a group of farmers on the Carson Creek flood plane west of Morris, all relative to flooding along the I & M Canal.

Paul Sheedy claims to have lost 8-10 inches of topsoil from his farm in the last two years, and he and several other farmers, including the Brown and Calahan families, blame the condition of the I & M Canal for their flooding problems. I urge you to do anything possible to include these individuals and community residents in your study.

Sincerely,


SENATOR JEROME J. JOYCE
43rd District
Illinois General Assembly

COMMISSIONERS:

STEPHEN G. PETERSON
Accounts & Finances
CHARD A. BARLA
Public Health & Safety
LILLIAN G. FRICKE
Streets & Public Improvements
CRAIG COSS
Public Property

"A Community With A Plan"

VILLAGE OF SENECA

WAYNE A. ANDERSON, MAYOR
Department of Public Affairs

Seneca, Illinois 61360

OFFICERS:

DARLENE KELLER
Village Clerk
LEILAH MCGHIEY
Treasurer
KEITH R. LEIGH
Attorney

January 19, 1984

Planning Division
Dept. of the Army
Rock Island Dist. Corps of Engineers
Clock Tower Bldg.
Rock Island, Ill. 61201

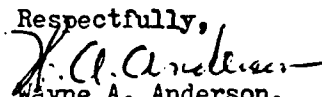
Gentlemen:

I was very pleased to receive Col Slofer's Dec. 14, 1983 Notice of Reconnaissance letter. I certainly feel the I & M Canal at Seneca is in dire need of attention.

The Village of Seneca regularly floods due to the condition of the I&M Canal. The Conservation Department, as well as area legislators, found the I&M to be in "deplorable" condition over a 4 mile area, with the Village of Seneca in the center of this "mess".

Hopefully, the reconnaissance will result in prompt attention given to a dredging program.

Thank you,

Respectfully,

Wayne A. Anderson,
Mayor, Seneca, Ill.
61360



REPLY TO
ATTENTION OF:

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING
ROCK ISLAND, ILLINOIS 61201

April 12, 1984

Planning Division

NOTICE OF PUBLIC MEETINGS

Initial Appraisal Study
for
Flood Damage Reduction
Illinois and Michigan Canal, Illinois

As a part of the Rock Island District (NCR) Initial Appraisal Study, the District will conduct public meetings and field observations along the Illinois and Michigan (I&M) Canal, April 24 and 25, 1984. Rock Island District will inspect sites inundated from reoccurring overbank flooding along the I&M Canal within the Rock Island District. The Rock Island District study area extends along the I&M Canal from La Salle, Illinois, to the Will and Grundy County borders.

Rock Island District is inviting interested State and Federal officials, citizens, and local groups to attend any of the meetings arranged to discuss flood damages along the I&M Canal. The scheduled meetings are listed below.

On April 24, 1984, at 2 p.m., the Rock Island District will conduct a public meeting at the Gebhard Woods State Park in Morris, Illinois. The meeting will be held at Dave Carr's office (Field Superintendent for the Illinois Department of Conservation) located in the Gebhard Woods State Park.

On April 25, 1984, at 9 a.m., the Rock Island District will conduct a public meeting in Ottawa, Illinois. The meeting will be held at the Ottawa City Hall, at 301 West Madison Street.

-2-

If you have any questions, please contact Mr. George Wells of this office at 309/788-6361, Ext. 6342, or write to the following address:

District Engineer
U.S. Army Engineer District, Rock Island
ATTN: Planning Division
Clock Tower Building
Rock Island, Illinois 61201

Sincerely,


Arthur J. Klingerman
Chief, Planning Division

D-7

Illinois



Department of Conservation

life and land together

LINCOLN TOWER PLAZA • 524 SOUTH SECOND STREET • SPRINGFIELD 62701-1787

CHICAGO OFFICE - ROOM 100, 160 NORTH LASALLE 60601-3184

David Kenney, Director - James C. Helfrich, Assistant Director

October 26, 1984

Mr. Arthur J. Klingerman
Chief, Planning Division
Department of the Army
Rock Island District Corps of Engineers
Clock Tower Building, P. O. Box 2004
Rock Island, IL 61204

RE: Initial Assessment phase of
Study of Drainage Problems in
and around the Illinois and
Michigan Canal between
Channahon and LaSalle-Peru.

Dear Mr. Klingerman:

The Illinois River Valley can be considered a highly sensitive area with regard to both historical and archaeological resources. All land disturbance in this area should be preceded by a thorough cultural resources survey. All floodplain investigations would include deep testing to check for the presence of buried sites. Our files do list the presence of five archaeological sites which fall within your two study areas. The location of these sites is as follows:

Study Area #1
LaSalle County

SW 1/4, Sec. 22 - 2 sites
NW 1/4, Sec. 22 - 1 site

Study Area #2
Grundy County

SW 1/4, Sec. 7 - 1 site
SW 1/4, Sec. 5 - 1 site

A major corridor survey was also conducted within parts of the study areas by A. Koski and K. Farnsworth (1977), "An archaeological survey and test excavation study of the Plano and East Frankfort Transmission Line Corridors, LaSalle, Grundy, Kendall, and Will County, Illinois." This study should be helpful for your staff in gaining an overview of the archeological densities in the various topographical locations within the region.

Mr. Arthur J. Klingerman
October 26, 1984
Page two

The Illinois-Michigan Canal is listed on the National Register of Historic Places as a National Historic Landmark and this, too, should be taken into account during your study. Any work proposed for the Canal, towpath and reserve should be planned to retain the historic integrity of the canal and its immediate environment. Once plans are formulated, it will also be necessary to obtain the comments of the Advisory Council on Historic Preservation in accordance with the procedures outlined in 36 CFR part 800.

Thank you for this opportunity to comment at this early stage in the planning process. If you have any comments or questions, please feel free to contact my staff.

Sincerely,

A handwritten signature in cursive script, appearing to read "William E. Farra".

for

David Kenney
State Historic Preservation
Officer

DK:AEM:nr



United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

ROCK ISLAND FIELD OFFICE (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

COM: 309/793-5800
FTS: 386-5800

October 7, 1988

Colonel Neil A. Smart
District Engineer
U.S. Army Engineer District
Rock Island
Clock Tower Building, P.O. Box 2004
Rock Island, Illinois 61201-2004

Dear Colonel Smart:

This constitutes our Planning Aid Letter for your study of flooding problems along the Illinois and Michigan (I&M) Canal from the Waupecan Island spillway to Carson Creek, between Morris and Seneca, Grundy County, Illinois. The authority for this study is Section 205 of the Flood Control Act of 1948, and the authority for our participation is Section 2 of the Fish and Wildlife Coordination Act of 1958. Your planning process is in the reconnaissance stage and this report will identify the fish and wildlife resources of the project area.

FISH AND WILDLIFE RESOURCES

The project affects a 4.9 mile section of the I&M Canal that does not hold water except during periods of heavy rainfall and/or runoff. Thus, no fishery values can be attributed to the site.

However, the site does contain significant wildlife values. The entire length of the study area, including the canal bottom and embankments, is vegetated with a variety of trees, shrubs and forbs including willow, boxelder, ash, elm, silver maple, dogwood, cattail, rice cutgrass, jewelweed, poison ivy and many other species. This corridor provides habitat for deer, squirrel, raccoon, fox, skunk, rabbit, wood duck, and a variety of song birds. If this section of the canal was flooded in the fall, it would have great potential for attracting waterfowl to feed on the submerged vegetation.

Adjacent habitats enhance the value of the canal corridor. A large wetland complex owned and managed by a duck hunting club is located on the north side of the canal at about Illinois River Mile 257. Many great blue herons, cormorants, wood ducks, blue-winged teal and coots were observed on the open water. No doubt many other species utilize the wetland as well, including beaver, muskrat, rails, egrets and other species of waterfowl. On the

south side of the canal at Illinois River Mile 256.5 is a farm field that apparently stays wet well into the spring, if not throughout the year. This area also provides migratory habitat for numerous waterfowl species. Adjacent farm fields that are planted with corn and other grains provide a food source for fall migrants and resident birds, particularly waterfowl and pheasants, and such mammals as raccoon, deer, fox, muskrat, opossum, rabbit and squirrel. The Illinois River itself serves as a migration corridor and attracts many species. The I&M Canal is an integral part of that corridor.

Our agency lists two endangered species that may inhabit the area. The Indiana bat (Myotis sodalis) is listed as statewide in distribution. It frequents the corridors of small streams with well developed riparian woods, and forages for insects by flying beneath the overhanging tree canopy, occasionally dropping to the water surface to drink. It roosts and rears its young beneath the loose bark of large trees that are generally greater than sixteen inches in diameter, and winters in caves and abandoned mines. The only Critical Habitat listed for this species in Illinois is the Blackball Mine on Pecumsaugen Creek in LaSalle County. Because of the transitory nature of this species, we cannot provide you with specific roosting locations from one year to the next. However, the project site does not contain any habitat that fits the above description except during times when there is water in the I&M Canal.

The other species, the Federally listed bald eagle, winters along large rivers such as the Illinois. During the winter, this species feeds in open water areas created by dam tailwaters and the warm effluents of power plants and municipal and industrial discharges. The more severe the winter and the greater the ice coverage, the more concentrated the eagles become. They roost at night in groups in mature trees near the river that are well protected from the harsh winter elements. There is no Critical Habitat designated for this species in Illinois. The only restrictions that apply to the eagle are that it not be harassed, harmed or disturbed. We are not aware of any winter roosts in the project area, either nocturnal or for feeding, and the presence of this species would be occasional or infrequent.

PROJECT IMPACTS

Two alternatives are being considered for the study area:

Clearing the entire reach - This includes removal of a 10-foot wide band of trees along both the tow and berm paths. Nine areas 0.1 acre in size will be cleared for disposal sites approximately every 0.5 mile along the project reach. Due to tree removal, the embankment and towpath will be rebuilt with material brought in from elsewhere, likely agricultural land nearby.

Project impacts of this alternative include the loss of 12.8 acres of trees from the tow path, embankments and disposal sites which will be seeded, presumably with grasses, and periodically mowed or otherwise maintained to prevent trees from becoming re-established.

Clearing and dredging the entire reach - This includes two possible levels for removal of material within the channel: 30,000 and 60,000 cubic yards. In either case, the width of the cut will be 36 feet. Clearing of 11.9 acres of the towpath and embankments is included as is the rebuilding of the embankments. Nine disposal sites will be located every 0.5 mile along the project reach for the dredged material and removed vegetation. These will also be cleared and material will be piled to a depth of five feet. Presumably, the canal, embankments and towpath will be reseeded with grasses and periodically mowed or otherwise maintained so that trees and shrubs will not become re-established. The canal bottom will likely revegetate with moist soil plants such as reed canarygrass, rice cutgrass and the like. It is unknown at this time what will occur at the disposal sites in terms of reseeding.

a. Dredging at the 30,000 cubic yard level will result in a cut of 0.9 foot in depth. Each disposal site will be 0.5 acre in size for a total of 4.5 acres. Thus, 16.4 acres will be cleared and 21.4 acres will be dredged for a total impact on 37.8 acres of the canal corridor.

b. Dredging at the 60,000 cubic yard level will result in a cut of 1.7 feet in depth. Each disposal area will be 0.9 acre in size for a total of 8.1 acres. Thus, 20.0 acres will be cleared and 21.4 acres will be dredged for a total impact on 41.4 acres of the canal corridor.

Implementation of any of these structural measures will result in a loss of wooded habitat and an increase in open, grassy and weedy habitat which, in turn, will be favored by different species of wildlife. The site would be less valuable for such species as deer, squirrel, raccoon, cavity and tree nesting birds, and would be utilized more by ground nesting birds, woodchucks and small mammals. One could consider this a trade-off of habitat values with a net change of zero, except that in a predominantly agricultural area wooded habitat is less abundant and more fragmented than grass and forblands.

It has been shown that many species of wildlife require large acreages (40+) of mature wooded habitat in order to meet their life requirements. Smaller fragmented patches of woods can provide the necessary life requirements for these species provided that the areas are interconnected by corridors of wooded habitat. The I&M Canal provides such a corridor and connects many small patches of woods as well as wetlands and other habitat

types along its length. Clearing a 4.9 mile reach of this corridor will interrupt the free passage of woodland species from one woodlot to the other.

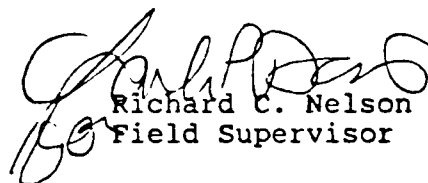
CONCLUSIONS AND RECOMMENDATIONS

We consider the loss of the wooded habitat along the I&M Canal to be a significant impact that must be mitigated. We consider the wooded habitat to be of high value to many species of wildlife and one which continues to become more and more scarce in the ecoregion. Our mitigation goal for such valuable habitat is no net loss of in-kind habitat value.

Therefore, we recommend that, if the clearing of trees cannot be avoided and/or minimized, an area in the vicinity of the I&M Canal twice the size lost be planted to native tree species, preferably mast producing hardwoods. If possible, an attempt should be made to connect other small, fragmented woodlots in order to create some continuity. Twice the acreage cleared is recommended because of the time lag between tree planting and the point in the future when the trees mature and become replacement habitat for that which is lost. Perhaps the project sponsor has some land on which the mitigation could take place.

We appreciate the opportunity of providing this input into your planning process and look forward to working with your agency as your plans progress.

Sincerely,


Richard C. Nelson
Field Supervisor

cc: IDOC (Lutz, Carr)
NPS (Hanson)



Illinois
Department of
Conservation
life and land together

office memorandum

to: Joe Slater, Army Corps. of Engineers
from: Bill Glass *BJ*
date: October 13, 1988
subject: E & T Species Along I & M Canal (Waupecan Spillway to Carson Creek)

I have had a check done for endangered and threatened species along this portion of the canal. Nothing showed up on the Natural Heritage database. From discussions with people who are familiar with the canal along this stretch, it appears unlikely E/T species would be threatened by this project.

Since it appears the project is not going to be done I don't think it would be necessary to do a field check at this time, especially given the lateness of the season.

If I can be of any further assistance let me know.

WG:ic

cc: Fran Harty

Illinois



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MARK FRECH, DIRECTOR

Mr. Richard C. Nelson
Field Supervisor
USFWS, Rock Island Field Office (ES)
1830 Second Avenue, Second Floor
Rock Island, Illinois 61201

Dear Mr. Nelson:

Department staff have reviewed your October 7, 1988 Planning Aid Letter for the Rock Island Corps Section 205 study of flooding problems along the Illinois and Michigan (I&M) Canal from the Waupecan Island spillway to Carson Creek, between Morris and Seneca, Grundy County, Illinois.

The Department concurs with your resource assessment and anticipated project impacts based on the two alternatives currently being considered by the Corps. We also agree with the mitigation as proposed for the alternatives studied.

However, in reviewing the project, staff has suggested a third alternative which, if feasible, would result in a reduced amount of clearing while possibly still achieving the necessary flood relief.

Rather than clear trees from both canal embankments and the 36 feet wide prism bottom, we suggest that only the prism bottom be cleared and then dredged as necessary. By doing this the embankments will not have to be rebuilt due to tree removal damage, no fill material to rebuild embankments will be needed, and fewer and/or smaller disposal sites will be needed since fewer trees would be cut. As a result, the project should have reduced habitat impact, construction cost, and mitigation cost. Further, we suggest that the work be done during the dry seasons (summer, winter) when construction equipment can operate in most areas of the prism. Otherwise, machinery would have to excavate wet material by reaching out from the towpath bank necessitating more clearing towpath repair, habitat loss, and cost.

Thank you for providing a copy of Planning Aid Letter.

Sincerely,

Mark Frech

Mark Frech,
Director

MF:RWL:se

cc: Rock Island Corps ✓
Hanson (NPS)

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DR ALLAN HIRSCH - DIRECTOR, OFFICE OF FEDERAL ACTIVITIES (A-104)
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WASHINGTON DC 20460

OFFICE OF ENVIRONMENTAL PROJ REVIEW, DEPARTMENT OF INTERIOR 12
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WASHINGTON DC 20240

MR VALDAS J ADAMKUS - ADMINISTRATOR, US ENVIRONMENTAL PROTECTION AGCY 3
230 S DEARBORN ST, CHICAGO IL 60604

MR RICHARD NELSON - FIELD SUPRVR, U.S.FISH & WILDLIFE SERVICE
1830 SECOND AVE. - 2ND FLOOR, ROCK ISLAND, IL 61201

STATE CONSERVATIONIST, SOIL CONSERVATION SVC USDA 2
301 N RANDOLPH, CHAMPAIGN IL 61820

MR JAMES C GRITMAN-REGIONAL DIRECTO, U.S.FISH AND WILDLIFE SERVICE
FEDERAL BLDG FORT SNELLING, TWIN CITIES MN 55111

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MR MARK FRECH - DIRECTOR, ILLINOIS DEPT OF CONSERVATION
LINCOLN TOWER PLAZA, 524 SOUTH 2ND STREET
SPRINGFIELD IL 62701-1787-1787

4

DIRECTOR, IL ENVIRONMENTAL PROTECTION AGENCY
2200 CHURCHILL ROAD, SPRINGFIELD IL 62706

DON KOCHVAR, CANAL ENGINEER
ILLINOIS & MICHIGAN CANAL, 30 NORTH BLUFF ST
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